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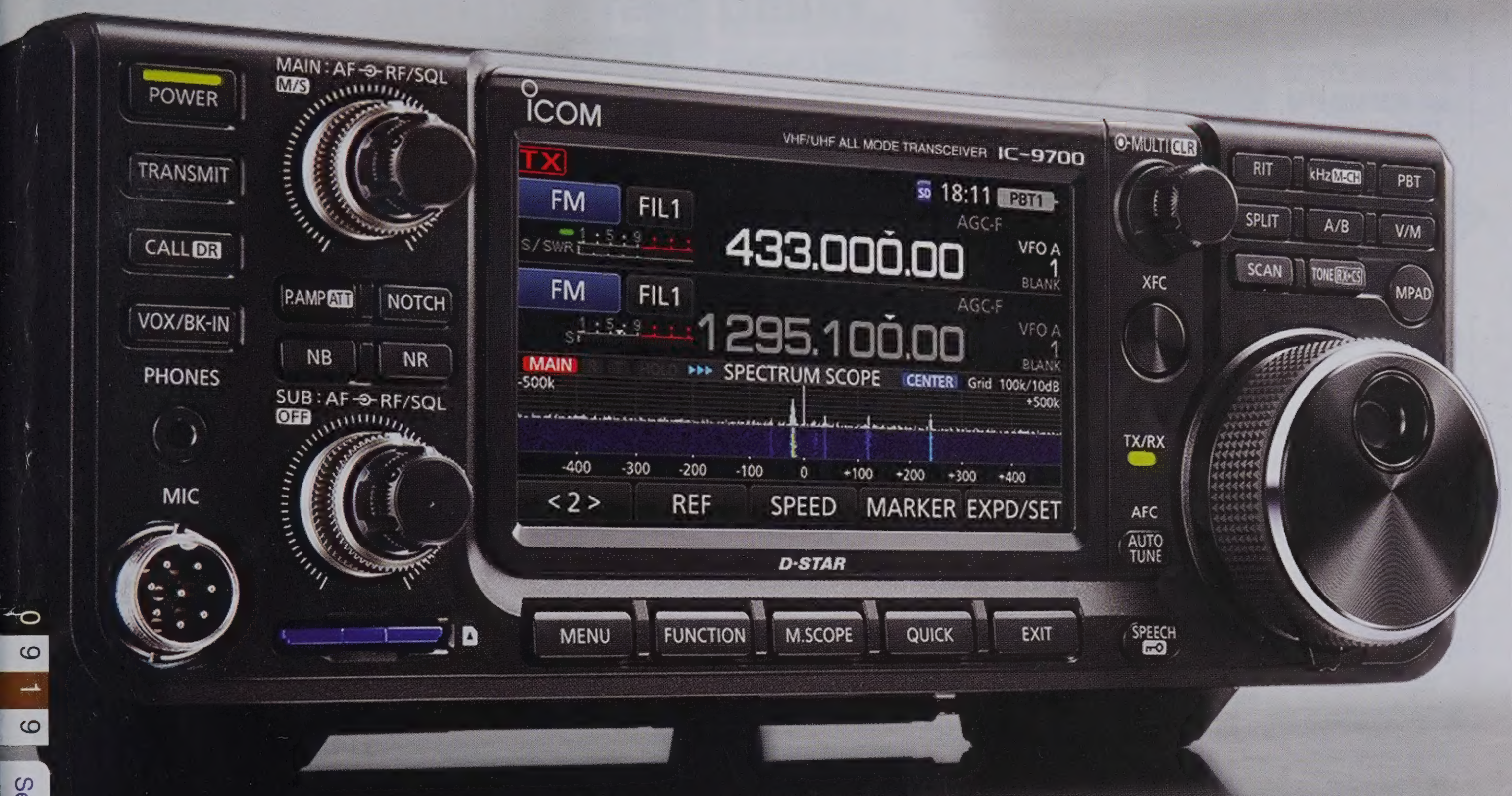
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VHF/UHF ALL MODE TRANSCEIVER IC-9700
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0919

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YAESU FT-891

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A modern day FT-857 without 2&70. Bang up to date in looks and smaller than a 2m only FM rig of 25 years ago!

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~~£659.95~~

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NEW!! ICOM IC-9700 2/70/23 BASE STATION ONLY £1795.95

CLICK HAMRADIO.CO.UK/IC9700

ICOM

These VHF/UHF All-Mode Direct Sampling transceivers sport the absolute latest technology.

- All mode, tri-band transceiver covering 144 MHz, 430MHz as well as 1.2GHz
- Supports CW/AM/SSB/FM/RTTY and D-STAR Digital Voice and Digital Data modes
- 144MHz and 430MHz band is direct sampling. The 1.2GHz uses down conversions as well.
- Full duplex operation/ Dual Watch (no VHF/VHF or UHF/UHF capability.)
- PA will provide a powerful 100 W (144MHz), 75W (430MHz) and 10W (1200MHz) output
- 4.3" touchscreen colour TFT LCD
- Smooth satellite operation with normal/reverse tracking and 99 satellite channels
- D-STAR provides clear digital audio
- Voice recording/playback function (SD memory card)
- Audio scope
- CW full break-in

NEW PRODUCT

THE ICOM IC-9700 VHF/UHF/1.2GHZ TRANSCEIVER IS NOW HERE. ML&S IS PLEASED TO BE ABLE TO OFFER THIS RADIO FOR IMMEDIATE SHIPPING.

ICOM IC-7300

100 Watt - HF/50/70MHz TRANSCEIVER with SSB / CW / RTTY / AM / FM

The IC7300 sports HF+6m+4m coverage, it's 100W, houses an eye-catching touchscreen TFT display and includes an internal antenna tuner.

ML&S ONLY : £1199.95

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NEW ICOM IC-R8600

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ML&S ONLY : £2499.95

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Order today and receive the matching SP-41 Speaker, SM-30 Desk Mic & Prism Cover FREE!

The Icom IC-7610 is a complete redesign of the former IC-7600 following on from the huge success of the IC-7300. 100W, Dual band receive and a huge widescreen display.

- **Further evolved RF direct sampling method.**
- **Excellent RMDR: 105dB realised.**
- **Dual watch function can receive simultaneously in different bands and different modes.**
- **DIGI-SEL unit that eliminates excessively strong signals is installed in the main and sub of the receiving section.**
- **High-speed real-time spectrum scope and waterfall display function.**
- **7-inch full-colour touch panel.**

FOR MORE INFORMATION CLICK WWW.HAMRADIO.CO.UK/IC7610

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100KHz-3.3GHz, AM/FM/WFM/SSB/CW. Digi-Modes P25/NXDN/ dPMR & D-Star.

ML&S ONLY : £569.95

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HF/6m/4m/2m/ 70cm dstar Base & Mobile Transceiver with remote control head unit.

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ML&S ONLY : £999.95

ICOM IC-2730

DUAL BAND MOBILE

FREE MBF-4

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ML&S ONLY : £289.95

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ML&S ONLY : £574.95

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HF/50MHz/70MHz Base Station

TRADE IN'S TAKEN!

ML&S NEW PRICE : £3499.95

Full Down Conversion and Roofing Filters Promise the Best Performance of Your DX Life.

FULL operation on HF/6m/4m (yes, it really has 70MHz!)

Full Down Conversion RX
- ✓ H-mode Mixer
- ✓ High C/N 1st LO

Built-in Roofing Filters
- ✓ 500Hz / 2.7kHz / 6kHz / 15kHz

7-inch Colour Display
- ✓ Roofing Frequency Sampling Band Scope
- ✓ Auto Scroll Mode
- ✓ Multi Information Screen
- ✓ 100W Heavy Duty Built-in Antenna Tuner

NEW PRODUCT **AVAILABLE NOW, SEE WWW.HAMRADIO.CO.UK/TS890S**

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HF/50MHz Base Station Transceiver

Built to order like its predecessor, the new IC-7851 is set to be a master-class transceiver of the highest order. Based on the Limited production run and very exclusive IC-7850, the IC-7851 is available today to order. Top prices paid on all trade-ins.

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TYT MD-UV380

Enter the new digital age in style with the TYT MD-UV380 DMR Digital Portable Two Way Radio!

DUAL BAND VHF/UHF DMR HANDHELD

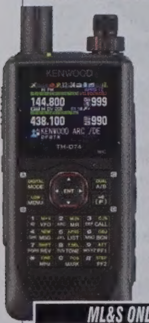
137-174/400-480MHz DMR Handie 5W.

RRP: £139.95
ML&S: £89.95

FOR MORE INFORMATION SEE WWW.HAMRADIO.CO.UK

KENWOOD TH-D74E

Dual Band Handie with unique APRS, D-Star & HF SSB receive coverage.



APRS communication protocol that provides real-time data communication in both directions by applying the packet communication, corresponding to the APRS. Share of position information and local information using a GPS, such as a message exchange, communication using a variety of functions can be enjoyed in this unit alone.

ML&S ONLY : £549.95

FOR MORE INFORMATION CLICK WWW.HAMRADIO.CO.UK/THD74E

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160-6m Base with ATU. Upgraded version HF & 6M FULL DSP Base Transceiver

ML&S ONLY : £1449.95

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KENWOOD TS-990S

200W HF/50MHz Base Station Transceiver with Dual TFT Display and Dual Receiver.

CALL FOR PRICE

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AOR AR-DV10

NEW PRODUCT

ALL MODE 100kHz-1.3GHz Digital Receiver

"The most Advanced Hand Held Receiver available today"

RRP: £999.95
ML&S: Only £899.95

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KENWOOD TM-D710GE

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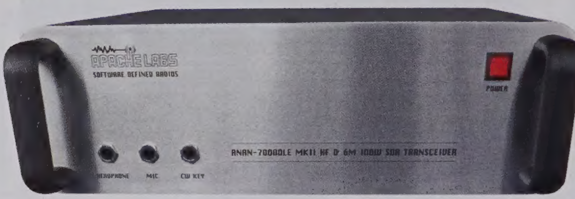
NEW ANAN-7000DLE MkII i7 100W HF+6M TRANSCEIVER



APACHE LABS
SOFTWARE DEFINED RADIOS

ML&S: £3699.95

*The **ANAN-7000DLE MKII** monoblock SDR transceiver incorporates an Intel 8th Generation i5/i7 core computer, the SDR client software is pre-loaded and calibrated making the unit completely Plug & Play! Unlike other Software Defined Radios which incorporate embedded processing with limited capabilities and no upgrade path, the ANAN-7000DLE MKII uses a powerful Intel 8th Generation Quad core SoC and Windows 10.* See: www.HamRadio.co.uk/7000DLE MkII

Also available, ANAN 7000DLE MkII without internal i7 PC. £2999.95

ANAN-8000DLE

ML&S: £3699.95

HF & 6M 200W SDR
Available from stock and it's on demonstration at our London Showroom.
www.HamRadio.co.uk/8000DLE

ZUMspot RPi

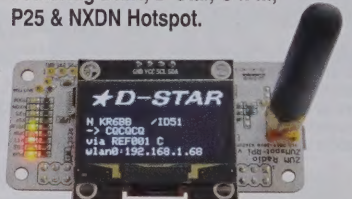
ML&S: £159.95

ML&S are the sole UK distributors for the new ZUMspot RPi, an advanced radio module board.

Assembled and tested: £159.95

Featuring DMR, D-Star, C4FM, P25 & NXDN Hotspot.

All ZUMspot Packages supplied by ML&S Include: ZUMspot Pi UHF Board, UHF Antenna, Raspberry Pi Zero WH, MMDVM software and Plastic Case



For more info see HamRadio.co.uk/ZUMspot

ZUM SPOT USB!

ML&S: £109.95

The ZUM-Spot USB new from KI6ZUM, uses the very popular BlueDv software to create a very versitile and simple to setup PC based hotspot. The ZUM USB comes ready to go with a small antenna and a very classy high quality case, it is a huge upgrade on the very popular DV4Mini and the BlueDV software is the cherry on the cake.

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ML&S: £929.95

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www.HamRadio.co.uk/fdmduoR

Also available in special red edition: £974.95

Receive only version also available: £729.95.

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60W / 120W HF/50MHz Linear Amplifier & Auto ATU with built-in PSU.

60W VERSION £929.95
120W VERSION £1099.95

Advanced SDR available with or without front panels.

Following on from the previous range, the new 64/6600 series offer the latest SDR technology housed in a stylish cabinet with or without the inbuilt colour screen and control functions. The ultimate performance direct sampling SDR technology and the best value for the serious HF/6m operator. Designed for the Ham who wants to operate the radio exclusively as a server from PC, laptop, Maestro, Mac, or iOS clients – whether local or remote.

FLEX 6400: £1999.95 FLEX 6400M: £2999.00
FLEX 6600: £3999.95
FLEX 6600M: £4999.00

FREE UK SHIPPING ON THIS PRODUCT
(UK Mainland only)

FLEX Maestro Controller
£1299.95

GoPro Hero 7 Black

Cancelled commercial order allows us to offer this brilliant rugged 4k video camera with digital stabilisation BRAND NEW & boxed.

£319.95 (RRP £379.95) Last few remaining.

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Dual band, Dual monitor and with a real VFO and GPS.

ANYTONE AT-D878UV DMR/FM/APRS HANDIE. £169.95
Adds APRS and DMR roaming.

AT-D878UV PLUS. £199.95
Adds Bluetooth functionality.

SDRplay RSPduo

Designed and built in Great Britain

DUAL TUNER 14-BIT SDR

Dual-Tuner wideband full feature 14-bit SDR, 1kHz to 2GHz, 10MHz of spectrum visibility. Simultaneously monitor 2 separate 2MHz bands of spectrum between 1kHz and 2GHz. 3 software selectable antenna inputs, & clocking features ideally suited to industrial, scientific, Ham & educational applications. Windows 10.

See www.HamRadio.co.uk/RSPDUO ML&S ONLY: £239.95

SDRplay RSP-1a

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1kHz-2GHz & 10MHz BW.
Brand new design, the RSP1A is a major upgrade to the popular RSP1 offering a powerful wideband full featured SDR covering 1kHz to 2GHz & up to 10MHz visible bandwidth. Better still, it's "Built & Designed in Britain"!!

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Contents

September 2019

News and Reports

Around Your Region – Club events calendar 84
Around Your Region – Events roundup 89
New products 14
News 12
RSGB Matters 6
Special Interest Groups News 16

Regulars

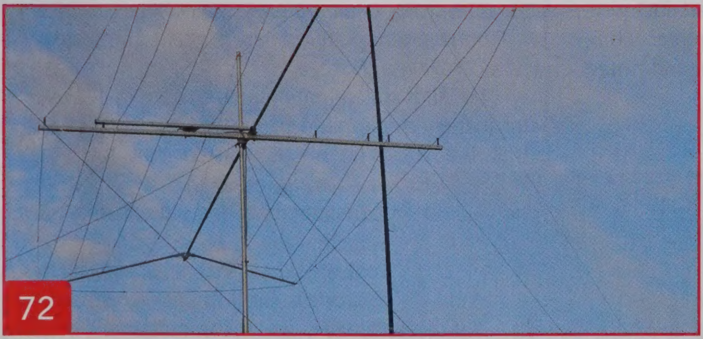
Advertisers index 93
Antennas, Mike Parkin, G0JMI 18
ATV, Dave Crump, G8GKQ 53
Contesting, Steve White, G3ZVW 76
GHz bands, Dr John Worsnop, G4BAO 66
HF, Martin Atherton, G3ZAY 62
Members' ads 94
Propagation, Gwyn Williams, G4FKH 96
Rallies & events 95
The Last Word 97
VHF / UHF, Richard Staples, G4HGI 64

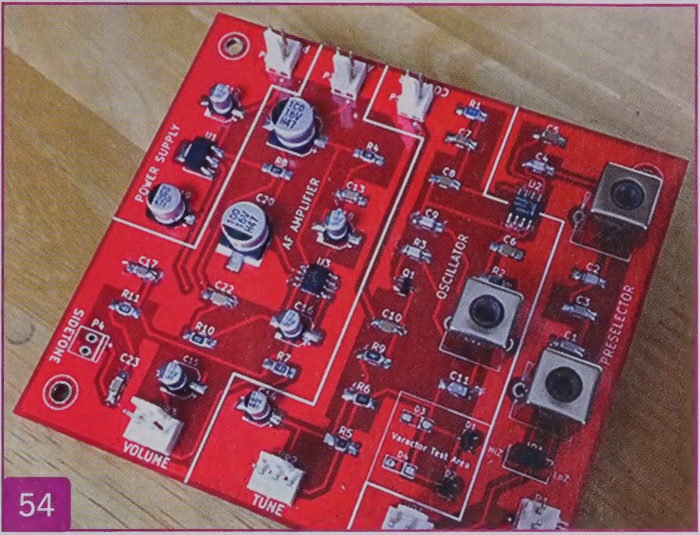
Special Offer

The Whizz Whip 45

Technical Features

Antenna secrets, the electron and radiation, David Sumner, G3PVH 30
Design notes, Andy Talbot, G4JNT 46





Features

2019 RSGB Convention 54
Developments in radio receivers, Godfrey Manning, G4GLM 82
National Hamfest 68
Nevada celebrates 50 golden years 60
RSGB Cricket World Cup Marathon, Nick Totterdell, G4FAL 78
What are you doing about interference? John Rogers, M0JAV 34
XX9D Macau 2019, Werner Hasemann, DJ9KH 72

Reviews

Anytone AT-D878UV Plus handheld, Tim Kirby, G4VXE 40
Book review 35
Icom IC-9700 transceiver, Andrew Barron, ZL3DW 22

RadCom
Icom IC-9700 all mode 2m-70cm-23cm

Cover image:
The Icom IC-9700 tri band (2m, 70cm & 23cm) transceiver. Photo courtesy Icom UK.

RadCom THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE
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RadCom Basics for Members new to the hobby can be found at www.rsgb.org/radcom-basics/
Abbreviations and acronyms we use are listed at http://tinyurl.com/RC-acronyms

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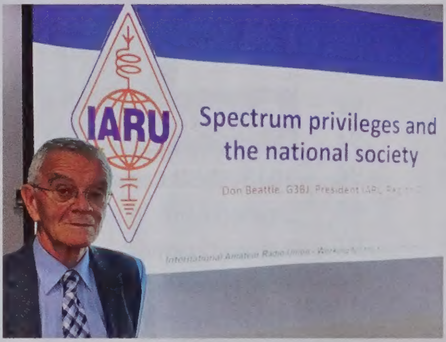
Keeping the Spectrum Clean

Amateur Radio
LS telco
telc

Radio communications consultancy LS telcom held its 24th annual spectrum summit on 3 July and invited the IARU to participate in a panel session on *Keeping the Spectrum Clean*. The IARU was represented by RSGB Microwave Manager Barry Lewis, G4SJH, who summarised the impact of the increase in man-made noise observed by radio amateurs in recent years across the HF to UHF frequency ranges and how the amateur community is dealing with this. LS telcom is a consultancy that specialises in spectrum monitoring and was particularly interested to hear the views from the amateur community. The audience of 200 came from 34 countries and included a wide range of representatives from across the radio communications industry and regulatory fields. See www.spectrum-summit.com/en/home/ for more information.

IARU R1 President speaks to the Board


IARU
Spectrum privileges and the national society
Don Beattie, G3BJ, President IARU Region 1

Don Beattie, G3BJ, IARU Region 1 President, was invited to the recent July RSGB board meeting to update them on the work going on in the IARU to address the current issues facing amateur radio. Don first explained the processes of worldwide frequency allocations and the bodies involved and how they interact. Knowledge of these processes will enable efforts by those representing amateur radio to direct their comments and evidence toward the most effective agencies and not to waste effort where little influence is likely.

Don then focused attention on the two largest sources of concern to amateurs today – frequency allocations and interference. Together with the other societies within the IARU, the RSGB will join in presenting evidence of the need to ensure that our allocation within 144-146MHz remains as a Primary allocation to the Amateur Radio Service and the problems that would be caused to both parties should the allocation become shared with any other service.

The matter of Wireless Power Transfer (WPT) and the issue of interference to RF was also discussed and an update upon the latest proposals from the manufacturing sector described. This is a longer term issue that all those organisations representing amateur radio, including the RSGB, will continue to closely watch and share information.

Ian Shepherd, G4EVK, RSGB Board Chairman.

RadCom Basics

RadCom basics

A new edition of *RadCom Basics* is now out. RSGB Members can read it by going to www.rsgb.org/radcom-basics, where you can also find out how to sign up for the *RadCom Basics* mailing list. Each edition of *RadCom Basics* explores key aspects of amateur radio in a straightforward and accessible way. *RadCom Basics* is sent as an email alert to subscribers when each edition is published. This email provides a list of contents and a link to the articles on the RSGB website. This edition looks at using repeaters in other areas, using WSPR and how to take part in September's SSB Field Day. www.rsgb.org/radcom-basics.

Callsign confusion

In the listing of Members and friends that visited the RSGB stand in Friedrichshafen we listed Martin, G3YJO. It should have been Fred, G3YJQ and we apologise to both gentlemen for mis-reading the callsign in the signing-in book.

RSGB President writes to Ofcom about 144MHz

After due consideration, and as reported in GB2RS news on 7 July 2019, the RSGB President Dave Wilson, MOOBW wrote to Ofcom strongly expressing the RSGB's concerns about the proposed WRC-23 aeronautical Agenda Item that includes 144-146MHz.

The President's letter started by stating that the RSGB "*shares the concerns of the global amateur community and views the French proposal as lacking a proper understanding of the implications of sharing an aeronautical application with weak-signal terrestrial and space communications services*".

It continued by saying that "*from our perspective, and in the view of the wider global amateur community, we do not foresee any realistic feasibility of a sharing scenario which does not seriously degrade or impede amateur usage of the spectrum, given the extent and complexity of current amateur services' Primary usage*".

The letter stated that there seems no justification for including this band in the proposed study, and that the RSGB is not convinced that there are "*any innovative sharing methods*" which would not inevitably constrain both incumbent and new services.

The letter went on to say that "*inclusion of this spectrum in the study is likely to involve regulators in a lot of extra work, when the outcome can be sensibly predicted at this stage*".

A set of appendices (6-page/1.2MB PDF) were attached to the letter, to enhance understanding of amateur radio usage in this band, and emphasise why any study for such new use would inevitably be fraught with complexity and likely to be unsuccessful.

The letter concluded with requests regarding three other WRC Agenda Items – 50MHz, Wireless Power Transfer (WPT) and 23cm/Galileo, where UK/Ofcom support is also sought.

For further information on these topics please see https://rsgb.org/main/news/special-focus/wrc-19/

QSL Matters

G3RS
Y89R
OJ0V
DX-PEDITION MARKET REEF 2017
Africa

Collecting QSL cards once meant simply pinning them to the shack wall to fade away, or placing them in albums and rarely seen again. Now there's a more interesting option. Low cost digital photo frames make it easy and practical to scan the best of your collection, create interesting displays and show them off to friends, family, shack visitors, club members or have them on a rolling display to remind you of great contacts. Digital albums of special interest, such as antennas, ships, station landscapes, people, places, DX, IOTA and more, are only limited only by your imagination.

On using www.QRZ.com: there's no doubt that QRZ.com is the go-to place for station information. When completing your outgoing cards either as a computer run or handwritten, it's wise to check the QSL choices for the intended station, to avoid cost, waste and disappointment. It's surprising how many don't check before they send and thereby make extra work, cost and delay for bureaux around the world.

Here's some guidance to consider:

- The information is only as good as the person who entered it. Remember to keep your own up to date and easy to understand. Note: every page automatically shows the last amended date.
- For 'QSL Direct', always send to the station address, never to the page manager or to the bureau with a via. It may be wrong or out of date
- If you wish to receive direct cards write 'QSL direct to address above'. This avoids confusion.
- For those giving no QSL details, it must be assumed they do not want or accept incoming cards.
- Always read the whole page, as some wrongly put their QSL info at the end of the page, not where it should be – at the top.

Unfortunately, not all stations collect cards sent via the bureau system. This is particularly common amongst those that use independent QSL managers. It's always wise to check on those stations that indicate that they use one of the active worldwide QSL managers. It's worth noting that the very active RSGB Contest Club call G6XX does not QSL via the bureau.

Latvia (YL) New Address: For those QSLing direct to foreign bureaus, here is confirmation of new address for Latvia (YL). Latvijas Radio Amatieru Liga, PO Box 40, Riga, LV-1010, Latvia. For packages of more than 2kg, there is a separate address: Latvijas Radio Amatieru Liga, Jekabpils iela 10, Riga, LV1003, Latvia.

146-147MHz NoV

Ofcom has agreed to extend for a further year the Notice of Variation (NoV) for 146-147MHz to encourage radio amateurs to experiment and test new communications schemes and systems. The current NoVs expire on 31 October 2019.

In the last year, 578 NoVs have been issued so far for this segment of the 2m band. Any Full licence holder may apply for an NoV for the 146-147MHz band for experimentation purposes (not just 'more of the same as on 2m'): go to www.rsgb.org/nov for details.

Latest info on 50, 144 and 1296MHz

As we get closer to the World Radio Conference, the RSGB Special Focus pages have the background and latest documents including the recent President's letter to Ofcom and an overview of how the process works. See rsgb.org/wrc-19. There is also extra information in The Last Word, see page 97.

G5RP Trophy

FOR PROGRESS IN HF DX
THE G5RP AWARD

The G5RP Trophy is an annual award to encourage newcomers to HF DXing. The award is not limited to youngsters or the newly-licensed; it is open to anyone who has recently discovered and made significant progress in HF DXing.

If you are an established HF DXer and want to recommend someone to be awarded the G5RP Trophy for 2019, now is the time to send in your nomination. Your nominee should be an up-and-coming HF DXer who has made rapid progress in the last year and has some real achievements to show, for example, a good total of new countries worked or some serious HF DXpedition activity.

This prestigious award will be presented this year at the RSGB Convention on 11-13 October. Please send your nominations to Ian Greenshields, G4FSU, QTHR, or by e-mail to hf.manager@rsgb.org.uk to arrive no later than Friday 6 September 2019.

New Convention videos

As we approach the 2019 RSGB Convention (see page 54), the final three videos of lectures from the 2018 Convention have now been released to RSGB Members. Go to www.rsgb.org/video and you will be able to view the latest three talks, along with many others from previous RSGB Conventions. Members may like to note that there are a total of 6 lectures from 2015, 13 lectures from 2016 and 25 talks from 2017 available on the RSGB website. Many of these are ideal for a club night viewing. Subjects range from amateur deep space reception to the polarisation of 50MHz signals – and almost everything in between.

The three new videos are Raei Paster, M0RTO who talks about *Magnetic Loop Antennas*; Dave Deane, EI9FBB relates the story behind the *Irish islands IOTA Tour in 2018* and Matthew Phillips, G6WPJ gives an update on *FreeDV*.

In total, the RSGB has released 28 videos of lectures from the 2018 Convention to Members.

You can find these, and others, at www.rsgb.org/video

NRC Update

RADIO STATION
GB3RS

Over four days, St George's School (Harpenden) brought 16 groups of young students to the RSGB National Radio Centre at Bletchley Park to learn about the importance of wireless to Bletchley Park and the relevance of wireless in society today. The students had the opportunity to see amateur radio in action on the short wave bands, with some passing greetings messages on the 20m band to stations in Italy, Hungry and Austria. A brief introduction was given as to how the FUNcube satellite could be tracked using software and the telemetry data analysed for STEM projects in schools. Finally, the students practiced sending their names in Morse Code and the school was given two of G4WKJ's Snail Morse keys. Such was the enthusiasm of the students that the school is now looking to start a lunch time radio club with several of the students expressing interest to take their Foundation licence.

Barnaby Shaw, M7BSN recently visited Bletchley Park with his godfather, M5RPT, his dad and sister. He really enjoyed the NRC, *"it had very cool tech and I liked learning about Morse code"*. It even managed to inspire him to become a radio amateur and has obtained a Foundation licence with Norfolk ARC. He hopes to do something with Bright Sparks (at the Norfolk club) and to take the Intermediate exam.

The IC-9700, kindly donated by Icom UK, is now installed on the radio bench in the NRC. The intention is to use this on SSB, CW and FM on the 2m and 70cm bands, including repeaters and D-Star. Like all new radios, the NRC volunteers will need to become familiar with it, but are all looking forward to seeing what the radio can do. See the review of the IC-9700 on page 22.

GB1NHS operated from the NRC on 17 July. Operating the RSGB's NRC station along with Paul, G1SMP and Pete, M0PSX were two visiting radio amateurs Martin, HB9TQX and Derick, KJ4VYK. GB1NHS is operated by the NHS Emergency Care Intensive Support Team. The aim of the station is to promote initiatives that improve the health and wellbeing of communities globally. Such initiatives include #EndPJparalysis and #ValuingPatientsTime. Further information can be found at www.GB1NHS.net.

On 6 July it was the 1940s weekend at Bletchley Park. On the forecourt outside the NRC, Peter, M0PJD and John, G4JGG set up and operated the WWII special event station GB1SOE making CW QSOs on 40m. A visitor, Barbara Williams, asked if she could try her hand at Morse code. As a WAAF in 1945/6, Barbara trained at Church Lawford and then went on to work at Compton Bassett, reaching speeds of up to 30 words per minute. With a slight hesitation, Barbara settled in a seat, laid her hand on the key and started sending Morse, instantly and faultlessly at more than 20 words/minute. Quite some achievement at more than 70 years later! Visitors watching on were amazed and burst into an immediate round of applause, feeling so privileged to have met a veteran.

VLT messages

The RSGB Volunteer Leadership Team (VLT) met in July and there were several key messages to come from the meeting.

Three presentations took place that looked at several priorities from the RSGB Strategy 2022.

Organisation: The introduction of four delivery teams within the Society's volunteer structure (Operating, Learning, Innovation and Representation) will take place in the near future. The new structure will simplify communications across the whole team of volunteers that will in turn, hopefully, lead to a better service being provided to Members and clubs. More detail will follow in October's *RadCom*.

Growth: Following a presentation on aspects of Future and Growth, discussions took place on defining the hobby and ensuring its continued attractiveness to newcomers. There was much passionate discussion on this matter. More to follow at the RSGB Convention when a lecture will launch the Beyond Exams initiative.

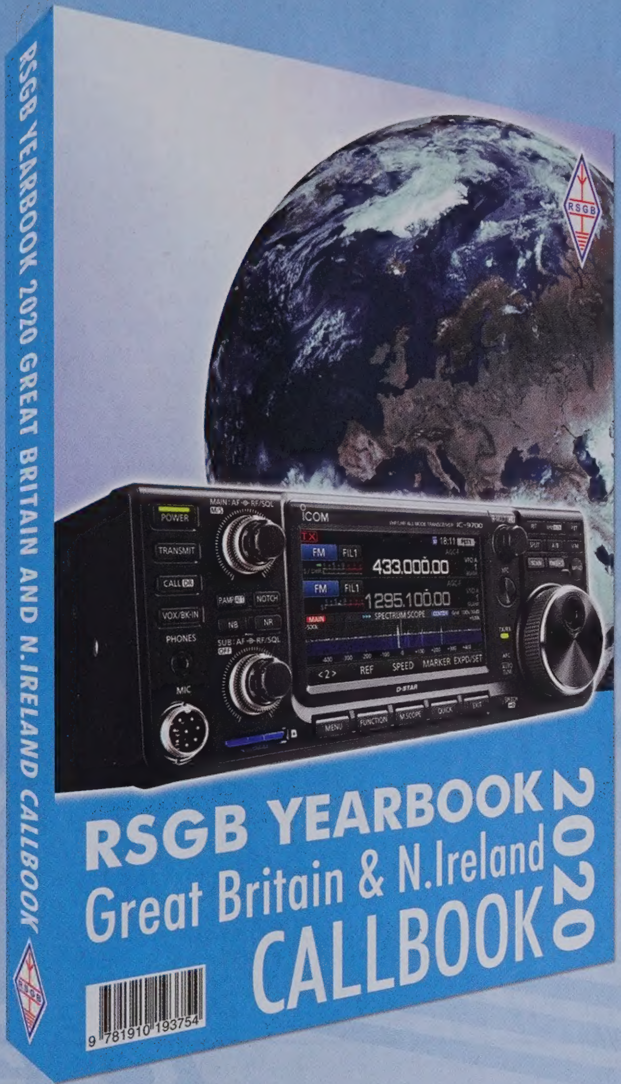
Growth and Participation: An update was provided on the Train the Trainers course, and suggestions for dates and venues for 2020s programme were requested. Ideally you will have available:

- A large room capable of comfortably seating 25 delegates and that is available on a Saturday between 9am and 5pm. (Essential)
- Break out areas where small groups can work
- Projector and screen. (Optional, if necessary one can be provided)
- Broadband Wi-Fi. (Optional, if necessary we can bring an access point but we do need 4G coverage at the venue)
- Tea and coffee available all day. (Essential)
- Somewhere nearby delegates can buy lunch. (Essential)

If your club would be interested in hosting a Train the Trainers event in 2020, please contact darg.lead@rsgb.org.uk for more information.

RSGB SHOP

NEW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RSGB Yearbook 2020

Edited by Mike Browne, G3DIH

MORE CALLS AND BIGGER THAN EVER!

With ever more UK and Northern Ireland callsigns on issue the RSGB Yearbook has grown by a whopping 48 pages this year. Over 90,000 callsigns are included and that doesn't count all that are on issue as you will also find details of Special Contest Calls, Permanent Special Event Callsigns and even Repeater, Beacons. There is only one source of current UK callsign data that is up to date and comprehensive – what are you missing if you don't have a copy?

Using the latest available Ofcom licence data, the *RSGB Yearbook 2020* remains the best source of UK callsign information. Why rely on incomplete and often out of date information when you can have current information? As usual this book is much more than a list of callsigns.

The *RSGB Yearbook 2020* is as it always is, the most comprehensive guide to amateur radio in the UK and worldwide available. There are over 170 pages of the latest information about the RSGB, its committees and services you will find also find local information about our regional representation, affiliated clubs, contest groups and repeater groups. There is a huge section on operating which covers from operating abroad, through RSGB Trophies, RSGB Awards to HF propagation forecasts for 2020. It doesn't stop here either there are the very latest Band Plans, comprehensive information about repeaters, beacons and much more. Broken into 50 sections there is a massive amount of the latest material from across the amateur radio world.

If you haven't purchased a Yearbook in a while, isn't time to get the very latest and best source of amateur radio information available – the RSGB Yearbook 2020.

* Only available at National Hamfest for the first 100 customers each day who purchase a copy at the show. Or with orders over £20
(Strictly Whilst Stocks Last)

210x297mm 576 pages ISBN: 9781 9101 9375 4
Non Members' Price: £19.99
RSGB Members' Price: £16.99

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FROM FREE P&P on orders over £30. See Page 74

E&OE *(All prices shown plus p&p)*

RSGB Annual Construction Competition 2019

The RSGB Annual Construction Competition, sponsored by Martin Lynch and Sons, will be held on Saturday 12 October at the RSGB Convention at Kents Hill Park, Milton Keynes. So, if you have entered a construction competition at your local club or written up a project for your club magazine, you have done most of the work needed to enter the RSGB Construction Competition.

What is the Construction Competition all about? We welcome entries covering any aspect of amateur radio – software, antennas, test equipment, receivers, transmitters and systems - the possibilities are endless! Any project that you have undertaken, other than one that was a previous winner in this competition, may be entered.

Who is it for? All entrants must be RSGB Members. You may enter as an individual, or as a team.

What are the categories? All entries will be judged together but the judges will consider awarding a prize in each of the following categories:

Innovation: The aim is to encourage and reward original designs, which can be software, hardware or a combination thereof. The entry will be judged on the elegance and innovation used to solve a new problem, or to solve a well-known problem in a better way. The entry will also be judged on the degree to which it advances the state-of-the-art in amateur radio.

Construction: The aim here is to encourage traditional construction projects. Entries may be original or based on a published design. Kits may feature, either as a part or the whole of the project. For kit builders, credit will be given for personal additions, modifications or finishing touches. Entries in this category will be judged on the overall quality of the construction/excellence in craftsmanship.

Beginner: This is aimed at those new to amateur radio. The entrant(s) must have an amateur radio licence for less than three years and not have prior professional experience in a related field.

Junior: This category is aimed at our young Members. The entrant(s) must be a Junior RSGB Member on the date of submission.

The judges will also select an overall winner and the constructor of the entry will receive the Pat Hawker G3VA trophy. Additionally the judges may award an additional prize for an entry that is not a winner in one of the above entry classes, but which they think deserves particular recognition.

Prizes: All entrants will receive a certificate of entry and a lapel badge for participating in this event, and thereby encouraging amateur radio home construction, experimentation, design and innovation. The prizes are generously provided by ML&S.

The closing date for entries is Friday 4 October 2019. All entries must be available for judging on Saturday 12 October at the RSGB Convention but the constructor need not be present in person.

The results will be announced at the Convention's closing plenary on the 13th. It is not necessary to be present at the plenary. Prizes and certificates will be posted to those unable to attend.

Go to www.rsgb.org/annualcc to register your entry.

Congratulations

To the following Members whom our records show as having reached 60 or 50 years' continuous Membership of the RSGB.

70 Years

Spen Valley ARS	G3SVC

60 Years

Mr A Shannon	G3KKJ
Mr A E Gwynne	GW3LNR
Mr I Jackson	G3OHX
Mr M A Hall	G3USC
Mr P Beecroft	G3WVY
Mr M J Bonner	G8ALB
Dr B G Taylor	HB9ANY
Mr D M Willoughby	RS27261

50 Years

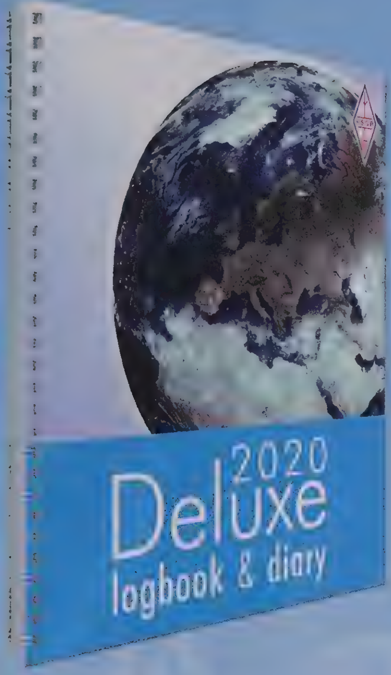
Mr M Melbourne	G0UYQ
Mr A L Beazley	G3WEF
Mr B R P Lindop	G3WUA
Mr N M Castledine	G4ALB
Mr N R Hadley	G4BSW
Mr J I Parkin	G4KZV
Mr A P Tidder	G8CHI
Mr I Suart	GM4AUP

The RSGB welcomes to the RSGB family the following new Members who have joined their voice to ours, helping to keep the RSGB strong.

Mr P Lane, 2E0OTY
Mr L Piggott, 2E0FGD
Mr C Gouveia, 2E0HTG
Mr M Tighe, 2E0TGY
Mrs E Gosal-Tooby, 2E0WND
Mrs C Wilson, 2E0XDV
Mr C Norwood, 2E0YYB
Mr M Moyse, 2W0NKS
Mr W Ringwald, AG5RO
Mr C Villalobos, CE1CVI
Mr K Clancy, EI3EU
Mr M Martin, EI4CKB
Mr D Law, G0LBK
Mr N Perkins, G3MA
Mr W Epton, G3NGJ
Mr P Rogers, G4SIR
Mr J Edwards, G6NZH
Mr T Hall, G8AFQ
Mr M Fill, G8ODF
Mr D Sinclair, G8PGE
Mr M Jenkins, GW7EYP
Mr G Pap, HA8MGC
Mr D Kaback, KG5WZU
Mr R Montelius, KG7WNB
Mr C Mitchell, KN4QEH
Mr M Stephens, M0HZX
Mr L Little, M0IQD
Mr N Tooby, M0MQV
Mr B de Savigny-Bower, M0RDB
Mr M Robson, M0RXG
Mr J Wedge, M0WEV
Mr C Smith, M0XTE
Mr A Coetzee, M0XZS
Mr A Buckley, M1BFF
Mr P Clark, M1EZS
Mr S Oakley, M3LEY
Mr T Ticehurst, M3TJT
Mrs A Wilson, M6HLP
Mr M Knaggs, M6ODZ
Mr J Tooby, M6SVS
Mr V Sheppard, M6VNT
Miss J Maxwell, M7AGO
Mr V Fox, M7AGX
Mr G Hiscock, M7AHB
Mrs K Hiscock, M7AHC
Mr J Martin, M7AHK
Mr D Kerr, M7DKS
Mr P Dyke, M7DYK
Mr G Joy, M7GDJ
Mr J Carr M7JEC
Mr J Zhilin, M7JIN
Mr S Jordan, M7KEJ
Mr K Webster, M7KJW
Mr K Ayre, M7KRN
Mrs L Wilson, M7LOU
Mr M Smith, M7MJS
Mr M Robson, M7MOR
Mr K Haley, M7MTD
Mr S Pinna, M7PWR
Mr D Martyn, MM7DAX
Mr J Dyson, RS314422
Mr S Ghent, RS316726
Mr L Rawlings, RS322359
Mr R Wood, RS323911
Mr D Scott, RS324137
Mr P Collins, RS324207
Mr D Faulk, RS324289
Mr P Venables, RS324333
Ms J Revell, RS324378
Miss L Wilson, RS324394
Miss C Wilson, RS324395
Mr B Wilson, RS324396
Miss A Wilson, RS324397
Miss B Wilson, RS324398
Mr P Ashworth, RS324399
Mr J Housley, RS324425
Mr A J Cooper, RS324428
Mr D Taylor, RS324537
Mr D Stokes, RS324596
Mr M Naylor, RS324616
Mr A Clark, RS324651
Mr G Lloyd-Coxhead, RS324689
Mr M Frolov, RS324690
Mr K Burt, RS324705
Mr N Moorby, RS324706
Mr M Gibbon, RS324707
Mr M Giacomelli, RS324728
Mr R Keeling, RS324771
Mr M Crosssman, RS324808
Mr J Moore, W4JHM

The RSGB would like to welcome back the following Members who have rejoined the Society.

Mr D Dimambro, G4KTP
Mr C Davis, 2E0GZZ
Mr BF Withers, 2E0OMR
Mr J E Outlaw, 2E0OUT
Mrs A Soars, G0ALI
Mr R Scheuber, G0BUY
Mr M Bedford, G0DXK
Mr D Ellins, G0GGL
Mr E Thorley, G0JBR
Mr S Fowler, G0NKU
Mr G R Coultas, G0TNU
Mr P Beard, G1OVK
Mr A Slaney, G3YZT
Mr K M Wells, G4CNE
Mr M J Hyde, G4IHZ
Mr J Uttley, G6CQD
Mr E Snell, G6PRE
Mr A P Idle, G7GOC
Mr P Stimpson, G7HGT
Mr G Beresford, G7KQW
Mr A Brookes, G7KXM
Mr A Batty, G8OZD
Mr R W Johnson, GM7CZC
Mr M Allington, GW1AKT
H G of NRRL, LA4C
Mr M Elkington, M0GUC
Mr D Spence, M0TTY
Mr J T Glover, M5HFJ
Mr M Bamber, M6CEB
Mr J Henley, M6XEQ
Mr R D Bowen, RS203175



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RSGB Deluxe Logbook & Diary 2020

MUCH MORE THAN A LOGBOOK!

This logbook isn't just somewhere to note your QSLs but is much more. Hugely popular the annual *RSGB Deluxe logbook & diary* contains a wealth of extra material just where you want it, when you want it, right at your fingertips in your shack.

The *RSGB Deluxe logbook & diary 2020* contains the latest UK Band plans, RSGB Contest Calendar, DXCC prefix list and RSGB QSL Bureau information. The information doesn't stop there either, a locator map (and an explanation of how locators work), repeater information, diary section, notes pages, handy lists of operating abbreviations & codes - pretty much everything you want to know when operating is included. The logbook section isn't forgotten either and there is a generous log section with plenty of space for you to record a whole year activity.

Some think of logbooks as old technology but there is nothing like looking back over old logbooks, an experience that a computer screen can ever recreate. Bringing back memories of old friends, satisfying and challenging QSOs for many there is nothing like it. So, if you are looking for an attractive way to record your log year by year the *RSGB Deluxe logbook & diary 2020* provides an ideal solution.

Don't forget - more than a standard logbook - yet it the same price!

The RSGB Deluxe logbook & diary 2020 includes:

- Current UK band plans
- European locator map
- Prefix guide
- Repeater listings
- QSL bureau information
- RSGB Contest Calendar
- Generous Log section
- 2020 Diary
- Handy lists of abbreviations & codes

Size 210x255mm, 80 pages ISBN: 9781 9101 9378 5
Non Members' Price: £5.99
RSGB Members' Price: £4.99

Callseeker Plus 2020

If you want a searchable database of callsigns from across Europe the *RSGB Callseeker 2020* is for you.

The *Callseeker Plus 2020* is the ONLY product that provides the very latest UK and Northern Ireland callsign data and European callsign data too. The 'easy to use' callsign search is simple interface that takes up no hard disc space as it runs straight from the CD or memory stick. You can search quickly by callsign, name or location and navigating through the search results is quick and easy. You can even print the results in a variety of formats including straight to an address label.

The Plus in the title *Callseeker Plus 2020* also means that not only do you get an electronic and searchable version on the RSGB Yearbook but there is bonus material from across Europe too. The RSGB Yearbook 2020 data includes the 50 sections and 170 pages of information in an easily searchable PDF format. So finding the very latest amateur radio reference information from the UK and around the World is a breeze too.

Two formats - one price
The *Callseeker Plus 2020* is available as either a traditional CD ROM or an USB Memory Stick version. The CD is in the full jewel case whilst the memory stick is encased an Eco bamboo shell. Both are highly portable and easy to use and provide a great alternative to the traditional RSGB Yearbook.

Callseeker Plus 2020 cheaper than a *RSGB Yearbook 2020* and with more callsigns too - a bargain!

CD Version: ISBN: 9781 9101 9376 1
Memory Stick: ISBN: 9781 9101 9377 8
Non Members' Price: £18.99,
RSGB Members' Price: £16.14

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FREE P&P

Battle of Arnhem 75th anniversary

A SPECIAL EVENT STATION
pa75omg
to celebrate 75 years of freedom

During the month of September, a number of Dutch special event stations (PA75PARA, PA75BTF and PA75OMG) will be on the air to commemorate the 75 years since British, American and Polish airborne forces tried to capture the river bridges at Arnhem and Nijmegen. This operation, called Market Garden, is often better known after the famous film *A Bridge Too Far*. PA75OMG will be on the air from 12 to 22 September.

Transglobe Expedition 40th anniversary

Conceived by Lady Ginnie Fiennes, wife of Sir Ranulph Fiennes, the surface travelling circumnavigation of the Globe via both poles started in 1979 and concluded successfully in 1982. The expedition planning took many years and, to date, remains the only successful traverse. All team members were unpaid volunteers, including ship's crew, the aviation unit, London support office and field party/base camp support group. On 2 September, at the Royal Geographical Society, Ran Fiennes, surface team member Oliver Shepard and Marine Coordinator Anton Bowing will tell stories accompanied by photographs and film about the expedition and each other. Tickets are available from https://tinyurl.com/y44og2y6

Lindars Radios

It all started back in June 2017 when Justin Lindars, 2E0JVL won a collection of amateur radio equipment from a local auction by mistake! He sold the first radio from that job lot decided to continue. He made contact with Rob, G3MYM, who helps identify various pieces of equipment and joined Yeovil ARC, who are always very supportive. Two premises later was a unit on a local industrial estate. Within the shop there is a vintage wireless museum area, a good selection of vintage and collectable Morse keys, library of books and manuals on all things radio related. The Open Day on 6 July saw Yaesu UK demonstrating the latest FTDX101D transceiver. There was a good turnout of radio enthusiasts; for some it was their first visit to the store. See www.amateurradiosales.co.uk

GB7CG in Milton Keynes

Moonraker has announced a networked 2m Fusion repeater for Milton Keynes and surrounding area. Thanks to Yaesu UK and Panorama antennas for support with the project, they will use a Yaesu repeater locked to Fusion with network access. Full details at www.ukrepeater.net/my_repeater.php?id=3948

Advancing the Art of CW

The purpose of CWops Award for Advancing the Art of CW is to recognise individuals, groups or organisations that have made the greatest contribution(s) toward advancing the art or practice of radio communication by Morse Code. There are two recipients for 2019. **FISTS CW Club,** in recognition of its promotion of CW over the years, and especially for advancing the skills of newcomers. **Hans Summers, G0UPL,** in recognition of his development and production of the unique QCX CW transceiver.

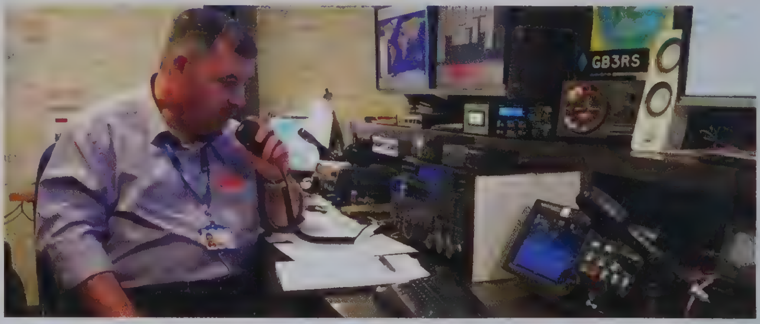
Dementia Awareness GB2DAW

Peter, MM0NQY and Gail, MM6YLO operated GB2DAW during Dementia Awareness Week in June. Sadly, Gail developed dementia two years ago and although she can hold a good conversation, she has lost confidence to operate the radio. The idea for the special event station was to make operators around the world aware of the problems of people affected by dementia. Throughout the week, with the help from other local operators in Shetland, they made international contacts as well as many in the UK. Operators were very patient and Gail was able to speak to many people. The smile on her face was worth every minute of setting things up. September is World Alzheimer's Month and they hope to run a special event station throughout the month.

Essex CW Bootcamp & Convention

Places for the Bootcamp and Convention to be held in Witham, Essex on 19 October are filling up. If you are interested in attending this year's event, and to avoid disappointment, contact Andy, G0IBN via g0ibn1@yahoo.com

GB1NHS at NRC



GB1NHS, the callsign for the National Health Service, was active recently from the RSGB's National Radio Centre at Bletchley Park. The station was activated by Paul, G1SMP from the NHS Improvements Team, supported by Pete, M0PSX and Martyn, G0GMB. Two overseas visitors to the NRC also made use of the GB1NHS callsign – Derek from South Carolina and Martin from Switzerland. The NRC also facilitated two satellite contacts using SO-50 to promote the NHS's tie-in with amateur radio.

Long distance visitor

Nevada Radio was delighted to be visited by Mario, VP8EME from the Falklands in July. Mario came to purchase an Icom IC-9700 but he also said that he will be looking for UK stations this autumn on 80/160m, as he has installed antennas for both bands. The photo shows Mario (left) with Nevada's Tim Johnson, G0WBR.

Homebrew Heroes Award

ICQ Podcast has announced a partnership in the founding of the Homebrew Heroes Award. This annual award is to recognise persons, groups or organisations who help define the frontiers in amateur radio technology through the long-standing tradition of homebrew construction. The new awards program is independent of the ICQ Podcast and you can read much more at https://homebrewheroes.org

New video of IC-9700

Following on from the *Introduction to the IC-9700 VHF/UHF/1200MHz Base Station SDR Transceiver* video, Icom UK has put together a more in-depth video called *Overview of the Icom IC-9700 SDR VHF/UHF Transceiver*. With the help from Bob McCreadie, G0FGX of TX Films, this video features Chris Ridley, G8GKC who goes through the range of features that the IC-9700, Icom's first VHF/UHF/1200MHz SDR has to offer. To view this film, which is on Icom UK's YouTube channel, go to https://youtu.be/mJ2cR71oPZM

Weston super Mare Radio Rally

The Weston super Mare Radio Rally will take place on 22 September at The Campus, Highlands Lane, Weston super Mare BS24 7DX. Doors open 10am to 3pm and entry is £3. There will be trade stands and a Bring & Buy stall. Enquiries to Dave Dyer by email to G4CXQ@btinternet.com.

GB100HAL

The special callsign GB100HAL has been issued to commemorate 100 years of RAF Halton in conjunction with the many events that are taking part celebrating the anniversary. The call may also be claimed towards the Airfields on the Air Award and is recognised by RAFARS for all their awards. The callsign will be used most Saturdays up until the end of the year.

Amateur radio works in a crisis

On 30 June, WAB Committee Member Esther, GI0AZA was engaged in a Worked All Britain activation of a rare square in Northern Ireland on 40m, when she picked up a 'Mayday' call from Richard, MW6RBH/M. He had come across an injured motorcyclist in an area of North Wales where there was no mobile phone signal. Esther called 999 and asked for Air Ambulance Wales – which she says is a bit odd for their 999 in NI! They put her through and she gave them the grid reference. The operator said she had never had this before. Esther had to go back and get nearest town details from Richard and when the air ambulance control heard her talking to him, they realised that this was genuine. The air ambulance was dispatched, and the motorcyclist airlifted out.

New Science Museum exhibit

Discover the remarkable world of codebreaking, ciphers and secret communications in a new exhibition at the Science Museum in London. From the trenches of the First World War to the latest in cyber security, *Top Secret* explores over a century's worth of communications intelligence through hand-written documents, declassified files and previously unseen artefacts from the historic collections of the Science Museum Group and GCHQ. It includes the story of Alan Turing and the team of Bletchley Park codebreakers who broke the Enigma code in 1941. *Top Secret* coincides with the 100th anniversary of GCHQ and runs until 23 February 2020. The exhibition is free but booking is required. See www.sciencemuseum.org.uk/.

Cornish summit challenge

Dennis Spratt, G7AGZ / M3DJS operated from five Cornish summits in aid of Cornwall Hospice Care. On 8 July he activated GB8BW from Brown Willy on Bodmin Moor, which was #1 on the list of the five official SOTA summits in Cornwall. He had completed all five plus the 'wild card' of the St Agnes beacon by 13 July. He is pleased to announce the total amount raised from this project was £2461.13, which means in thirty years his fundraising total using amateur radio is now more than £20,000.

ML&S Friedrichshafen visit

In June, ML&S staff visited the Ham Radio exhibition at Friedrichshafen in Germany and made a recording of their time there. With just their phones as cameras, you can see the resulting film at www.MLandS.TV

CHOTA station

This year's Chapels and Churches on the Air is on 14 September. Organised by World Association of Christian Amateurs and Listeners (WACRAL), please register your station with John, G3XYF, via email to g3xyf@btconnect.com.

GB2SCC will be activated at St Cynllo Church in the village of Coed Y Bryn, Ceredigion, Wales between 10am and 4pm. They expect to be active on 80m and 40m SSB from IO72TB. QSL via the bureau.

New Products

200W version of the FTDX101

As the UK's only factory authorised distributor and retailer, ML&S will be receiving their first delivery of the 200W version of the FTDX101, the FTDX101MP, in August. There has been a lot of interest in the 200W variant, priced at £4199.95, including the additional VCT-101 VC-Tune unit.

The Yaesu FTDX101 series name is based on the famous FT-101 first released in the seventies by Yaesu Corporation of Japan. These rigs were extremely reliable, and various improvements were made over the model range, especially to the receiver, from Mk1, Mk2, B and E models (very few F models were ever produced). This was also one of the first all-in-one box rigs, as it had a built-in mains and 12V DC inverter power supply and even a loudspeaker, which made it ideal to use portable (it even had a carrying handle on the side). They also included two switched crystal-controlled positions for Novice licence holders, who were restricted to crystal controlled transmission until the late 1970s. This feature was also handy for fixed net operation.

Martin and his team will have a demonstration rig at their London showroom and are taking orders for this new flagship from Yaesu. You can read more information on the new 200W FTDX101MP from Yaesu at www.HamRadio.co.uk/ftdx101MP

Guying Mast Clamp

Building on the success of their original mast clamps, Mastrant have developed a new light version. The original is 4mm thick, 40mm high with M8 screws and the new light version is 2.5mm thick, 25mm high and uses M6 screws. The clamps are strong and durable (screws, nuts and washers are AISI 316, brackets AISI 304) and the bracket (bent steel plate) is universal. In the bracket is a hole for security bolt that is sold separately. The holes for guys are 16mm (HD) and 12mm (Lite) can adopt shackles / chain couplers / carabiners from 4mm and thimbles from 3mm up to 10mm (HD) or 8mm (Lite). The heavy duty clamps range from €18 to €25 and the light version from €13 to €18. See www.mastrant.com

MAT-TUNER™
1.5
2.0
3.0
PWR
TUNE
CUP
CDN
LUP
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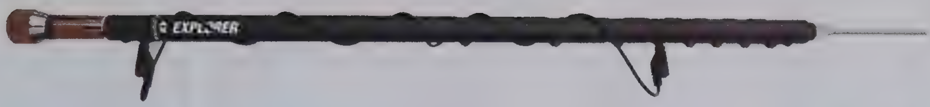
POWER
mAT-125E

HF Automatic Antenna Tuner

The MAT-Tuner mAT-125e is an HF ATU that is suitable for mobile, portable or home operation with any transceiver up to 125W. It will tune dipoles, verticals, Yagis or virtually any coax-fed antenna and has 16,000 frequency memories. When tuning on or near a previously tuned frequency, the mAT-125E uses 'Memory Tune' to recall the previous tuning parameters in a fraction of a second. If no memorised settings are available, the tuner runs a full tuning cycle, storing the parameters for memory recall on subsequent tuning cycles on that frequency. It contains two 18650 Li batteries, which do not need external power supply and comes with a dedicated charger. Costing £189.95 from LAM Communications, you can find out more at www.hamradio-shop.co.uk

RadioVybe platform

www.radiovybe.com is a platform that equates your radio station online and makes your broadcast more socially interactive on mobile devices. The mobile friendly website freely connects your station socially to the rest of the world. RadioVybe is free and you can find out more at www.radiovybe.com



New multi band portable antenna

The Komunica Explorer 3 HF Multiband antenna covers 80, 40, 30, 20, 17, 15, 12, 11, 10, 6 and 2m, plus airband. It's suitable for portable operation, with a maximum power rating of 200W. In use, the length is between 117 and 162cm and it weighs just 635g. It costs £89.95 and is available from LAM Communications. See www.hamradio-shop.co.uk

microHAM USB interface

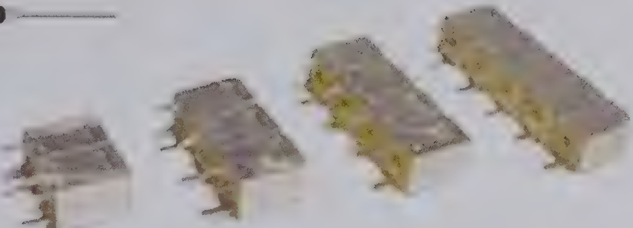
DXP™ is a lightweight, portable transceiver-to-computer USB interface with a high dynamic range and low noise 24-bit audio ADC and DAC to facilitate high quality digital operation (FT8, RTTY, JTxx, PSK31 etc) and FSK. CW operation is supported by the WinKey CW keyer developed by K1EL, now in version WKv3.1 with FSK support.

DXP™ is the first microHAM interface entirely utilising standard USB class devices for its USB operation. This means, that drivers are already incorporated in all current major computer operating systems, no driver installation is necessary. DXP does not need a USB Device Router for operation.

The DB15F system connector is fully compatible with previous microHAM interfaces: USB II, USB III, DK, and DK II and uses the same DB15 cables.

The DB15F costs €270 and is available from http://microham.com

DXP
PWR CW FSK
24-bit AUDIO
CW
TX RX
PTT AUDIO
TX
microHAM
FSK
DE OM7ZZ
SETUP
RX
RX SUB



VHF, UHF and microwave amateur band filters

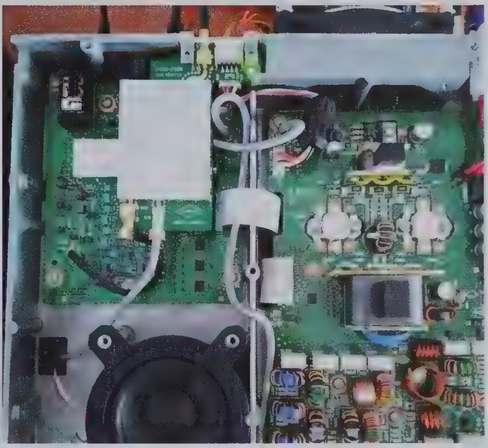
Temwell Filter Store designs and builds a number of VHF and UHF bandpass filters for a variety of bands including 70MHz, 146MHz, 435MHz, 1270MHz and 2400MHz etc. There is no minimum order, so you can have a single filter if required. They can also design filters for your specification. Go to https://temwell.shoplineapp.com

RadioAnalog PRTX-7300

RadioAnalog has introduced the new PRTX-7300 for the Icom IC-7300 that provides an RF output to enable connection of an external SDR device for full panoramic display. It is very easy to fit internally with no soldering or alignment necessary, and allows the user to obtain an RF output to drive any of the SDRs including SDRplay, AirSpy etc. The RadioAnalog PTRX-7300 can be installed easily, taking only 15 minutes and no tools are required other than a Philips screwdriver.

Available from ML&S, the sole distributor, the PRTX-7300 is available at an introductory offer of just £179.95 plus p&p.

For more information see www.HamRadio.co.uk/PRTX7300



New 200MHz digital storage oscilliscope

SIGLENT's new SDS1000X-E Series super phosphor oscilloscope is available in one bandwidth, 200MHz. It has a maximum sample rate of 1 GSa/s and a standard record length of 14Mpt. For ease-of-use, the most commonly used functions can be accessed with its user-friendly front panel design. It comes with a minimum vertical input range of 500μV/div, an innovative digital trigger system with high sensitivity and low jitter, and a waveform capture rate of 400,000 frames/ sec (sequence mode). The new design also includes a hardware co-processor that delivers measurements quickly and accurately. Costing £365 including UK delivery, look out for a review in a forthcoming RadCom. www.labtronix.co.uk

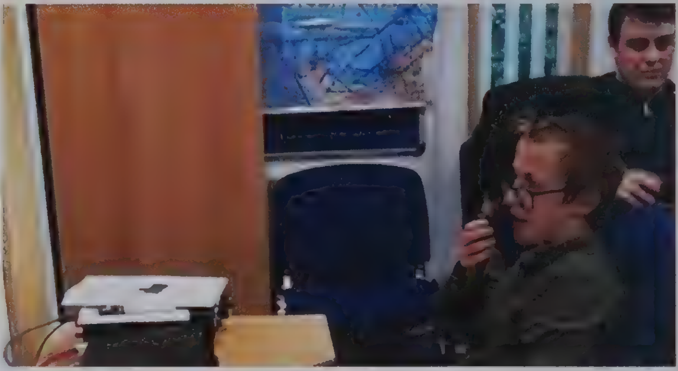
Portable and waterproof inflatable antenna

GM3HNN has designed a new antenna for the 144-148MHz band based on a professional inflatable antenna used time and time again by the Emergency Services. The Tx range is 144-148MHz and the Rx range is 118-174MHz. it comes complete with a quick inflate tube, carry pouch and 6m of cable to a PL259 connector. It can handle 75W and is just 5ft in length, weighing 400g. A UHF version for 430 to 440MHz is also available. See GM3HNN on www.qrz.com or Twitter @AntennaAir

RSGB working with national associations and special interest groups

We try to bring you the best news from RSGB-Affiliated national and special interest groups (SIG) each month. The RSGB is very pleased to hear your news and forthcoming events. Particularly if you are associated with an Affiliated group that isn't mentioned here, please get in touch with the RSGB Special Interest Groups Manager, Simon Taylor, MW0NWM, via email to sig.manager@rsgb.org.uk

Exercise Blue Ham



Over the weekend of 15 &16 June, Exercise Blue Ham was run utilising the 5MHz (60m) shared band from eleven different locations around the UK. Many of the stations were manned by RAF Air Cadets. A Blue Ham exercise hasn't been run during the summer months for a couple of years but, due to many requests from both the Cadets and amateurs to have the opportunity to get out and work in the field or go portable, we managed to get a date when the weather was going to be on our side! With this in mind we saw five /P amateur stations make the effort to get out an enjoy the fresh air, warm weather and try different antenna configurations that they would not normally use at their home location; well done to these guys for trying something different and actively taking part. During the weekend most exchanges were by microphone but we did have some exchanges using Olivia Signal 16/500 on the band, which proved to be good. This may be a mode to monitor and operate in the future especially if conditions are not going to be so good for some time.

Operating conditions proved difficult from time to time with heavy fading and static crashes from the thunderstorms in central France/Germany. The band going completely quiet did affect the number of QSOs but with patience and perseverance some 377 contacts were logged onto the Alphacharlie online log page. PDF certificates have been sent out to those that have requested them; many thanks to the amateurs for taking the time to make contacts with our callsigns.

Here is some of the feedback that has come into the Blue Ham email address:

- I would like to take the opportunity in saying how good the operating standards of all those involved was. Huge credit to the trainers for their work. **G4LOE**
- It was a fun weekend, what with the crashing of QRN from the storms on Saturday, the varying NVIS conditions. My friend stayed after lunch today and listened in to some of the information exchanges. She enjoyed it, especially when I tried to call MRE61 and MRE11 tried to sneak in to grab more points! The resonant dipole and quiet – QRM location made all the difference. I hope to use the same place in October (weather depending). **M0PLT/P**
- Thank you from running these events that are very enjoyable and give is all good message handling practice! **G1KAR/P**
- I was very pleased to take part but the propagation was of course fairly poor, I thought the radio procedures etc of the Cadet stations I copied were of a high standard. The operators I heard had a pleasant and efficient comms technique. All best regards to all, 73, **G4DYC**
- Great weekend despite the poor conditions, we are certainly all looking forward to the next one. **G1DVA**
- Very variable conditions and some good operators on the air over the weekend. **G6OHM**
- Our club members enjoyed working your Air Cadets, please thank them for their hard work this weekend and we wish them all the very best in their future careers! **MX0IOA**

We will be running Exercise Blue Ham on 19 October. For the latest information please check out https://alphacharlie.org.uk/exercise-blue-ham, where you can find full details including the QSO exchange information.

If you are keen on sharing your radio knowledge and experience with young people then why not look into joining one of the cadet organisations local to you as a volunteer? More details are available at

- https://www.raf.mod.uk/aircadets/want-to-join/join-as-an-adult-volunteer
- https://armycadets.com/volunteer-with-us
- https://www.sea-cadets.org/volunteer

Flt Lt David Webb RAFAC
Blue Ham Exercise Co-Ordinator

NATIONAL CLUBS

Amateur Radio Caravan & Camping Club,
membership@arcc.org.uk www.aarc.org.uk
September rallies: Grendon, Warks

AMSAT-UK – http://amsat-uk.org/
Open net every Sunday, 10am, ±3.780MHz

British Railways ARS
Ian, G4EAN, www.brars.info
Nets: Tues 7pm 3.68MHz, Fri 4pm 3.685MHz

British Young Ladies Amateur Radio Association
www.bylara.org.uk
Net Thursday, ±3.688MHz, 6.30pm.
All YLs welcome.

Civil Service Amateur Radio Society
Weekly net every Tuesday, 8pm, 3.763MHz

CDXC – The UK DX Foundation – cdxc.org.uk
For all interested in HF DX and contesting

Radio Amateur Old Timers' Association
MemSec@RAOTA.org, www.RAOTA.org
Diamond Jubilee year. Nets: see website

World Association of Christian Amateurs & Listeners
Richard Paul, G7KMZ, G7KMZ@wacral.org
Various nets, see www.wacral.org for full details including frequencies and times.

Worked All Britain Awards Group
www.worked-all-britain.org.uk
Nets most evenings, ±3.760MHz, time variable

The radio... YAESU

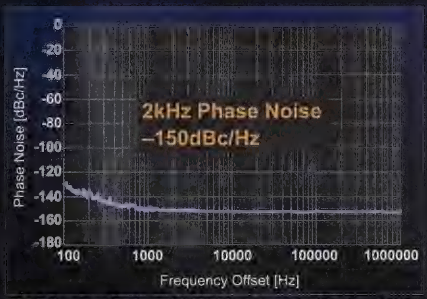
The Conclusive Choice

Transmit Signal Purity

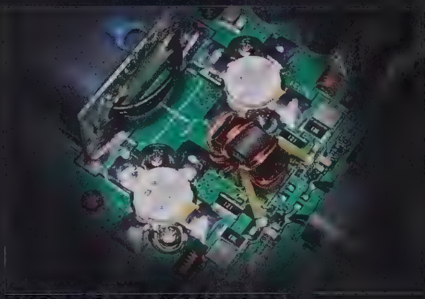
High-Quality Transmission with Outstanding Phase noise characteristics

The excellent C/N characteristics provided by 400MHz HRDDS (High Resolution Direct Digital Synthesizer) used in the FTDX101 local oscillator circuit contribute significantly to the superb performance of both the receive and the transmitter sections. Yaesu conducted a thorough examination of each element in the transmission final stage such as clock distributor that divides/distributes the local signal from the 400MHz HRDDS circuit as a clock signal to each block, as well as FPGA, D/A converter, final power amplifier etc., and then carefully selected the latest circuit configuration to improve the C/N characteristics of the entire transmitter block. The transmission signal of the FTDX101 is generated directly from a 16-bit D/A converter without passing through the mixer circuit, therefore distortion and noise are significantly suppressed.

As a result, high-quality local signal characteristics are maintained without degradation to the final stage, and the transmission phase noise characteristics achieve an extraordinary –150 dBc/Hz at 2kHz separation. FTDX101 transceiver users will enjoy the outstanding performance as well as confidence and pride in the high-purity of their transmission signal.



TX Phase Noise (14MHz Band, Mode:CW)



TX Final Stage (MP Version)

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FTDX101MP

In Homage to the Founder of Yaesu – Sako Hasegawa JA1MP

FTDX101MP 200W

HF/50MHz TRANSCEIVER

The Ultimate

FTDX101D 100W

HF/50MHz TRANSCEIVER

YAESU
The radio

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Unit 12 Sun Valley Business Park, Winnall Close
Winchester, Hampshire SO23 0LB

For the latest Yaesu News , visit us on the internet at www.yaesu.co.uk

Specifications subject to change without notice. Some accessories and/or options may only be standard in some areas. Check with your local Yaesu Dealer for specific details.

Antennas

Antennas, elements and what's the gain?

The theme in this month's column is the concept of why the signal strength between a transmitting and a receiving station seems to vary with a change in frequency, even if the physical distance between the two stations does not alter, the propagation conditions remain constant and other variables stay the same.

Background

Photo 1 shows two beam antennas: a 5 element for use on the 2m band and a 'homebrewed' 27 element for use on the 23cm band (to the G8AZM design). There is a significant difference in directional gain between both of these beam antennas. For example, the 2m beam has a gain of about 9dBi (about 7dBd), while the 23cm beam has a gain of about 21dBi (about 19dBd). Therefore, why should it be necessary to use a higher gain beam antenna at a higher frequency to achieve a similar performance over the same distance assuming all aspects of the radio equipment connected to the antennas and the propagation conditions do not change?

Note: dBi is the gain of an antenna in dB referred to a theoretical isotropic radiator. dBd is the gain of an antenna in dB referred to a half wavelength dipole and is about 2.16dB lower than the gain in dBi **[1]**.

An explanation

It is easier to examine this concept by using the following example as shown in **Figure 1**. Taking the case of two stations where the operational RF wavelength (λ) in use is very small compared to the physical distance (d) between the stations and the receiving station is situated in the far-field **[2]** away from the transmitter's antenna. The description to follow also presumes the transmitting and receiving stations are located in an empty environment where there are no absorbing obstacles, no reflecting surfaces and the influence of the earth's surface is assumed to be absent.

Consider a theoretical isotropic radiator, placed at the centre of an imaginary sphere and fed with a transmit power Pt. The isotropic radiator uniformly illuminates the inner surface of the sphere, giving a signal strength at a distance (d) of:

$$\text{Signal strength} = \frac{Pt}{\text{Sphere's inner surface area}} = \frac{Pt}{4\pi d^2} \qquad (1)$$

If the isotropic radiator is replaced with the actual transmit antenna, also fed with the same power Pt, then this concentrates its radiated RF signal and illuminates a specific region inside the imaginary sphere as shown in **Figure 2**. The boundary of this region is defined where the RF signal has halved (ie reduced by 3dB). This region represents an increase in the RF signal strength compared to the isotropic radiator as a result of the transmit antenna's concentrating effect, or a gain (ie GT). Therefore, the signal strength at a distance (d) is now given by:

PHOTO 1. Example of a 5 element 2m beam and a 27 element 23cm beam. Why should the 23cm beam need so many elements?

$$\text{Signal strength at d} = \frac{GT \times Pt}{4\pi d^2} \qquad (2)$$

As a result, the square of the distance between the two stations (d^2) becomes a factor in determining the RF signal strength at a distance from the transmitting antenna.

Referring to the receiving end in Figure 1, the power available (Pr) from the receiving antenna is a function of the antenna's aperture (A), or capture area. The larger the antenna's aperture, so the more effective the antenna becomes. Factors influencing the receiving antenna's aperture (A) include the antenna's isotropic gain (GR) and the operational wavelength (λ), with A given by **[3]**:

Mike Parkin, G0JMI
email2mikeparkin@gmail.com

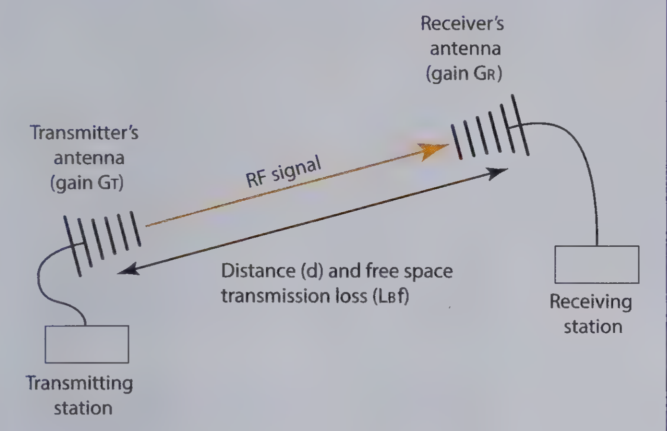
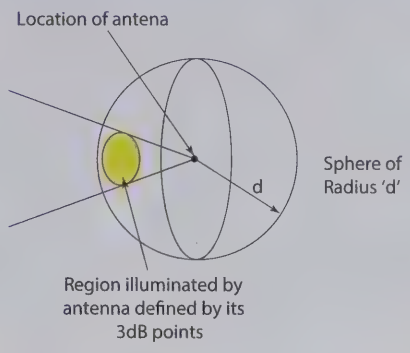

Receiver's antenna (gain GR)
Transmitter's antenna (gain GT)
RF signal
Distance (d) and free space transmission loss (LBf)
Receiving station
Transmitting station

FIGURE 1: Concept of the free space transmission loss (LBf) between stations.



Note: The overall area of the sphere = 4 x π x d ²

FIGURE 2: The concept of how a beam antenna concentrates the RF field over a distinct region of an imaginary sphere surrounding the antenna giving rise to directional gain.

$$A = \frac{GR \times \lambda^2}{4\pi} \qquad (3)$$

As a result, the square of the wavelength (λ^2) in use by the two stations becomes a factor in determining the received power (Pr).

Multiplying equations (2) and (3) together gives H T Friis' transmission equation **[4]** that allows the power (Pr) available at the receiving antenna to be calculated:

$$\text{Receive power (Pr)} = Pt \times GT \times GR \times \left(\frac{\lambda^2}{(4\pi d)^2}\right) \qquad (4)$$

Where:

Pr is the receive power level available from the receiving antenna (watts).
Pt is the transmit power level supplied at transmitting antenna (watts).
GT is the isotropic gain of the transmitting antenna.
GR is the isotropic gain of the receiving antenna.
d is the distance between the receive and transmit antennas.
λ is the operational RF wavelength in use.

If GT and GR are made equal to one, and then rearranging the equation, allows Friis' transmission equation to be expressed as a loss. This is often referred to as the free space transmission loss (LBf):

$$\text{Free space transmission loss } (L_{Bf}) = \frac{PT}{\text{Pr}} = \frac{(4\pi d)^2}{\lambda^2} \qquad (5)$$

Using $\lambda = c/f$, where c is the speed of light and f is the frequency of operation, then translating the equation into decibels (dB) gives:

$$LBf(\text{dB}) = 10Log(4\pi)^2 + 10Log(d^2)10Log(f^2) - 10Log(c^2)$$

Rearranging this equation gives:

$$LBf(\text{dB}) = 20Log(4\pi) - 20Log(c) + 20Log(f) + 20Log(d)$$

If f is in MHz, c is 300,000,000m/s and d is in kilometres, then:

$$LBf(\text{dB}) = 32.44 + 20Log(f) + 20Log(d)$$

From these equations, we can understand that the free space transmission loss (LBf) between a transmitting and a receiving station has three characteristics:

- A constant loss factor that will be always present of 32.44dB (or a loss ratio of about 1/1754).
- As the frequency of operation (f) increases, so the loss LBf also increases.
- As the distance (d) between the stations increases, so the loss LBf also increases.

Change in operating frequency

The impact on loss LBf, between transmitting and receiving stations, with a change of frequency is shown in **Table 1** when the distance (d) is kept constant at 1km. For example, when the operating frequency is changed from 144MHz to 1296MHz, then loss LBf increases by about 19dB. Assuming everything else remains the same, either the receiving or transmitting station's antenna gain could be increased by 19dB (but not both) to compensate allowing the same signal strength to be received at 1296MHz compared to operating at 144MHz. This effect helps to explain why, when operating on a higher band, a high gain antenna needs to be used to maintain a similar received signal level compared to operating on a lower band.

When the operating frequency (f) is doubled and the distance (d) between the transmitting and receiving stations is kept constant, then loss LBf increases by 6.02dB (taken as 6dB for practical purposes). This effect is shown in **Table 2** for the HF amateur frequencies where there is an actual second harmonic relationship. This is a reason behind why the points on a receiver's S-meter are usually calibrated in steps of 6dB (typically from 0 to S9). For example, if the received station's signal strength was S8 when operating on 3.55MHz, then a change of frequency to 7.1MHz can be expected to decrease the received signal strength to S7 provided everything else is kept the same (including both the antennas' gain). To increase the received signal strength back to S8 necessitates a four times increase in the transmitter's power level (ie by 6dB), or an increase in the receiver's gain by 6dB (by using a receive RF preamplifier, for example).

Increasing distance

Another characteristic of loss LBf equation occurs when the operating frequency (f) is kept constant and the distance (d) is increased between the transmitting and receiving stations. As the distance is doubled, the change in loss LBf increases by 6dB. This effect is shown in **Table 3** where the distance (d) is changed from 1km to 256km and the frequency (f) is kept at 50.15MHz (although any frequency could have been chosen). This is another reason why the points on a receiver's S-meter are usually calibrated in steps of 6dB. Consequently, if a transmitting station is received at a signal strength of S7, if that station relocates to a site at twice the distance away, then this station's signal strength can be expected to decrease to S6 provided everything else is kept the same. Consequently, and in a similar way as above, to return the received signal strength back to S7 from S6, then an antenna with an additional 6dB gain could be used, or the transmitter could increase its power by 6dB, or the receiver's gain could be increased by 6dB.

TABLE 1: Loss LBf calculated against frequency when the distance between the stations is constant at 1km.

Frequency (MHz)	Free space transmission loss (dB)
1.85	37.78
3.55	43.45
7.1	49.47
14.2	55.49
28.4	61.51
50.15	66.45
70.2	69.37
144	75.61
432	85.15
1296	94.69

TABLE 2: Loss LBf calculated against frequency when there is a second harmonic relationship. The distance between the stations is constant at 1km.

Frequency (MHz)	Free transmission space loss (dB	Difference (dB)
3.55	43.45	-
7.1	49.47	6.02
14.2	55.49	6.02
28.4	61.51	6.02

TABLE 3: Change in loss LBf as the distance is doubled at 50.15MHz.

Distance (km)	Free space transmission loss (dB)	Difference (dB)
1	66.45	-
2	72.47	6.02
4	78.49	6.02
8	84.51	6.02
16	90.53	6.02
32	96.55	6.02
64	102.57	6.02
128	108.59	6.02
256	114.61	6.02

Conclusion

Returning to the original question of: "why should it be necessary to use a higher gain beam antenna at a higher frequency to achieve a similar performance?"

This question may be answered using the free space transmission loss (LBf) equation where, as the operating frequency is increased, so loss LBf also increases. Therefore, to compensate for the extra loss, this requires a corresponding increase in the overall system gain to maintain the same performance. This extra gain can be obtained by using a higher gain antenna rather than by changing the radio equipment. Similarly, as the distance between the stations is increased, so the LBf increases and this can also be allowed for by using a high gain antenna.

References

RSGB Radio Communication Handbook, 13th edition, edited by Mike Browne, G3DIH:

[1] Chapter 1, Principles, page 1.23

[2] Chapter 13, Antenna Basics, page 13.1

[3] *RSGB VHF/UHF Manual,* 4th edition, edited by G R Jessop, G6JP, chapter 8, Antennas, page 8.2

[4] H T Friis, A note on a simple transmission formula, *IRE Proceedings*, vol 34, no 5, pp 254–256, May 1946

Easy-100 update

The 'Easy-100' upconverter for QO-100 (Es'hail-2) was published in the June edition and the article has generated a lot of interest.

Since the design appeared, a flourishing online special interest group has been set up **[1]** and many people have built, or are building, their own version. There have been a number of suggestions for changes and/or improvements, plus discussions on sources of parts. Of particular interest have been the power amplifier and antenna options, not least because the price of the latter shot up as soon as people started buying them. Various alternatives have been suggested, up to and including a group multi-buy from a source in the USA that would work out at a reasonable price, even accounting for shipping and taxes.

I have not yet had time to develop the downconverter mentioned in the original article. However, I would like to disclose my general design thoughts in case someone else cares to pick up on it. Please share your results if you do so and get it working!

My outline plan is to use a Sky dish and LNB powered at 12V by a DC inserter/block. The RF spectrum from the LNB will contain unwanted signals – the satellite TV channels – above our wanted signal (at ~739MHz), so a filter is required. I tried a *lot* of filters to find an affordable, adjustment-free option and settled on an inexpensive (£6) Mercury AF4G TV 4G filter. It passes UHF and cuts off sharply at 790MHz. The plan is to feed its output to the same kind of ADL5350 mixer module used in the upconverter, fed by a ~306 or ~1172MHz LO signal from the same type of LCD-programmed synthesiser previously used.

The output of the mixer should be fed into a 433MHz bandpass filter and then to an amplifier (acting as a buffer). Fit a T-piece adapter before the upconverter's 433MHz filter and feed the buffer amp's output in there, via a lot of attenuation (maybe 60dB). Your 70cm Rx will be sensitive enough to hear the satellite signals, but they won't drive the upconverter mixer hard enough to create any significant RF output on the uplink channel.

This gives switchless T/R and, in keeping with the Easy-100, uses off the shelf parts.

[1] https://groups.io/g/Easy-100

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ICOM

IC-9700

VHF/UHF/1200MHz SDR Transceiver

HOME
1200 MHz
430 MHz
144 MHz
OUTDOOR
EME
SATELLITE
DV/DD MODES

- RF direct sampling system (144 and 430MHz bands)
- Triband (144, 430 and built-in 1200MHz bands) and all modes, including AM and DV/DD
- Receives and demodulates two signals simultaneously in D-STAR DV mode
- High-speed real-time spectrum scope and waterfall function

ICOM
VHF/UHF ALL MODE TRANSCEIVER IC-9700
POWER
TRANSMIT
VOX/BK-IN
PHONES
MIC
MAIN : AF ⊸ RF/SQL
PAMP ATT
NOTCH
NB
NR
SUB : AF ⊸ RF/SQL
FM
FIL1
433.500.00
1294.500.00
SPECTRUM SCOPE
REF
SPEED
MARKER
EXPD/SET
DIGITAL
MENU
FUNCTION
M.SCOPE
QUICK
EXIT
MULTI
XFC
TX/RX
AFC
AUTO TUNE
SPEECH
SPLIT
SCAN
MPAD

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ICOM
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18:11
433.000.00
100.00
FM
FIL1
TX
POWER
CALL
PHONES
MIC
SUB : AF-RF/SQL
MAIN : AF-RF/SQL
REF
SPEED
MULTI
TX/RX
D-STAR

Icom IC-9700

3-band VHF UHF transceiver

The IC-9700 is the latest VHF/UHF transceiver from Icom. It is an amateur band only, tri-bander capable of operating on the 2m, 70cm, and 23cm bands.

433.000.00
1295.100.00
7.073.00

A matching pair! The IC-9700 for VHF and UHF and the IC-7300 for the HF bands and 50MHz.

This new radio uses direct-digital sampling SDR technology similar to the revolutionary IC-7300 and IC-7610 transceivers and the IC-8600 receiver. It has a unique feature set, offering many functions never seen before in a VHF/UHF transceiver. These include direct sampling technology, an SDR type panadapter spectrum and waterfall display, plus D-Star operation and full duplex satellite capability in the same radio. You also get scan modes, a voice keyer, CW and RTTY message keyers and a built-in RTTY decoder. It is currently priced at around £1,800.

Basic functions

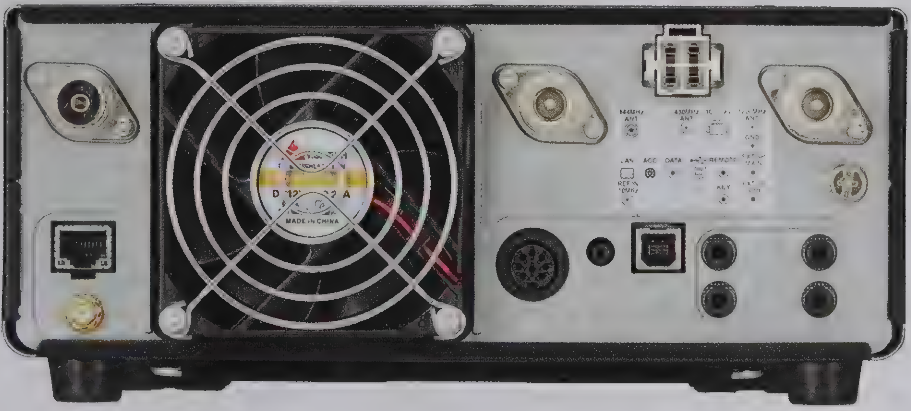
The IC-9700 is a fairly compact radio with exactly the same case dimensions as the IC-7300 transceiver and a similar weight. It measures 240(W) x 94(H) x 238mm(D) and weighs approximately 4.7kg. The front panel design is identical to the IC-7300 although due to the dual receivers and the VHF/UHF capability, several buttons and knobs have different functions. The rear panel features three antenna connectors, one for each band. The radio has two, fully independent, receivers enabling it to receive on any two out of the three bands at the same time. The single panadapter display can display signals from either the 'main' or the 'sub' band. It has a maximum display bandwidth of 1MHz, the same as the IC-7300. This is adequate but a lot less than many small box SDR receivers.

When both receivers are active, the screen is spilt with the 'main' receiver VFO and control icons displayed above the sub receiver VFO and icons. Apart from the satellite mode, the top (main) section displays the band that the radio will transmit on. You swap bands by pressing the top volume control. Pressing the lower volume control turns the second receiver on or off.

In many respects, the radio behaves as if

ICOM
IC-9700
433.000.00
1295.100.00
SPECTRUM SCOPE
D-STAR
FUNCTION
M.SCOPE
QUICK

The front panel of the IC-9700 tri-band transceiver - 2m, 70cm and 23cm.



The rear panel of the IC-9700 features three antenna connectors, one for each band.

there were three separate radios inside the box. Each band has its own memories, scan ranges and filter settings. You can't scan a set of memory channels containing frequencies on two different bands. However, you can make both receivers scan at the same time.

The radio supports AM, FM, SSB, CW, RTTY, and the digital voice (DV) D-Star mode, plus external digital modes via the USB cable. It also supports the 128kbit DD (digital data) mode on the 23cm band. Frequency coverage is limited to the band limits of the three amateur bands for your geographic region or country. There is no general coverage receiver. However, with an abundance of cheap SDR receivers on the market, this is unlikely to be a handicap. The transmitter is capable of 100 watts on the 2m band, 75 watts on the 70cm band, and 10 watts on the 23cm band.

The IC-9700 supports a huge number of memory channels. Each of the three bands has 99 standard memories, plus six call channels. There are also memory slots for 99 satellite specific channels, 300 GPS memories, and 2500 for D-Star repeaters.

I was impressed with the auto-selection of repeater duplex. If you tune across a repeater output sub-band, the radio automatically selects the correct plus or minus duplex split. This means that if you tune to a repeater output, the radio will automatically set the transmitter to the repeater input frequency. This feature may not be available in all regions. You can save the channel into a memory location without having to manually set the duplex offset. This function can be disabled if you want to transmit in simplex mode on that part of the band.

The radio requires a nominal 13.8V supply and draws a maximum of 18A.

The manual is split into two parts. The 96 page 'Basic' manual is provided as a paper copy. There is also an 'Advanced' manual that can be downloaded as a .pdf file from the Icom.jp website. Unlike the IC-7300 and the IC-7610, the radio did not ship with a CD containing the Advanced manual and schematics. If you buy an IC-9700 you probably will need to download a copy of the Advanced manual.

The radio is provided with a standard electret hand microphone, the HM-219. I have received excellent reception reports while using it. The microphone connector is a standard 8-pin connector rather than the RJ-45 type fitted to some radios. Also, in the box, there is a fused DC cable, some spare fuses, and a 3.5mm stereo plug. The 3.5mm plug is useful, but not as useful as the (more difficult to source) 2.5mm plug for the data connector, or the 8-pin DIN connector for the accessory jack.

There are only a limited number of differences between the model available here in New Zealand and the model available in the UK. Some bands are a bit different for the EU models but, according to the Service Manual, there are no other differences. The EU version covers 144-146MHz on the 2m band. My 'USA/Export' version is 144-148MHz. Our 70cm band in NZ is the same as yours, 430-440MHz, but my radio will transmit up to 450MHz. You can restrict it with a menu setting. The EU radios are restricted to 430-440MHz. The UK/EU 23cm band is the same as NZ and the USA. It is 1240-1300MHz, but Korea, Italy, and Taiwan are different. As a result, the down conversion IF is a little different for Korea, Italy and Taiwan.

Radio design and architecture

Direct digital sampling is used for both the receive and transmit signal paths. The 23cm band is down-converted to a 311-371MHz IF for the 23cm receiver and upconverted from a slightly different IF bandwidth for the transmitter. Each band has its own antenna connector. If you have a multi-band antenna, you can use a diplexer or triplexer to combine two or all three bands onto a single feeder cable.

Incoming receive signals pass through individual preamplifier, attenuator, and bandpass filter stages followed by a pair of pin diode switches that select any two of the three input signals. The outputs of the switches are passed onto an LTC2156 dual ADC. A Cyclone-V FPGA performs all of the DSP functions other than a specialised chip for D-Star. There are several CPUs including a 'soft-core' CPU in the FPGA and an ARM Cortex A9 processor that is used to handle the touchscreen and front panel controls. A separate CPU drives the spectrum scope display. Finally, there is a DAC to convert the audio data back into an analogue signal for the speaker and audio outputs.

The transmit path is basically the same thing in reverse. Microphone audio is converted to a digital signal by an audio ADC. The signal goes into the FPGA where DSP magic happens. There are separate processors for control functions and D-Star DSP processing. The FPGA output, already at the transmit (or 23cm IF) frequency, is converted into an analogue signal by a high-speed 16-bit DAC clocked at 1179.648MHz. This is followed by an RF amplifier and a low pass filter, then a switch to route the

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signal through various driver amplifiers and filters and on to the appropriate RF power amplifier and low pass filter. The 23cm band transmit signal comes out of the DAC on a frequency between 305.632MHz and 365.632MHz. Prior to the driver stage, it is upconverted to the wanted frequency on the 23cm band by a mixer and a fixed oscillator on 1605.632MHz.

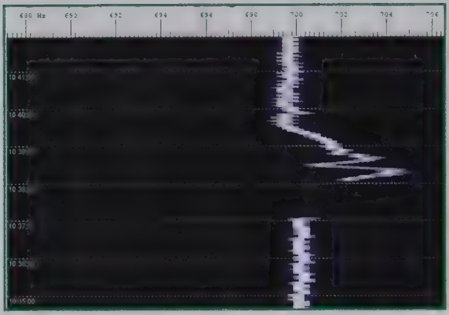
The main oscillator is a ±0.5ppm high stability TCXO, which can optionally be governed by a 10MHz GPS reference clock or rubidium clock signal applied to the rear panel reference input. The receivers' ADC chip is clocked at 196.608MHz (that is four times the main oscillator frequency) and close to the maximum sample rate of the device. This places the 2m band into the 2nd Nyquist zone, the 23cm band IF into the 4th Nyquist zone, and the 70cm band into the 5th Nyquist zone.

Removing the covers reveals a well-constructed, clean layout with circuit boards mounted on the usual compartmentalised sturdy die-cast frame and an integral heatsink. The main board is on the top side and the three RF boards are on the bottom side.

Improved sound quality has been addressed by attaching the upward-facing speaker to the die-cast chassis with rubber mountings. Although there is just a single speaker for the two receivers, the audio from both receivers is available at separate speaker outputs on the rear panel and as separate or mixed channels on the stereo headphone jack.

D-Star

The Icom Advanced Manual devotes four chapters to D-Star operation. A total of eighty-one pages, compared to the section on satellite operation, which only rates three pages. You can operate D-Star from the normal VFO mode or memory channels, but there is also a special DR (digital repeater) mode, which makes accessing and linking to repeaters and reflectors much easier. The DV/DD memory bank can hold 2500 repeater definitions. These can be imported from a .csv spreadsheet file saved onto the SD card. The Icom CS-9700 programming software is available as a free download from the Icom website. The radio has all the D-Star features found on other D-Star enabled radios. You can work simplex to another D-Star radio, through a local repeater or hotspot, or through a local repeater or hotspot and the internet, to users connected to other repeaters or reflectors worldwide. The system works very well with no noticeable latency. On the 23cm band, this type of operation can even be used to provide a low-speed data or internet connection via your transceiver and a 23cm repeater (where this is legal).



I measured 30Hz of frequency drift in the minute following a one-minute transmission at full power on the 70cm band.

Linked repeaters and reflectors don't have to be D-Star specific, many of them are for DMR, System Fusion, or DMR users. This allows you to talk to hams who are using radios employing a different type of digital modulation.

You can connect an NMEA compliant GPS receiver to obtain accurate GPS location, speed and direction information for transmission over the DV (D-Star) mode. If you are not intending to operate mobile or portable, you can enter your location information manually. The location or GPS data is also used to determine the closest repeaters to you, and the distance and bearing between your location and the users of connected D-Star repeaters and reflectors worldwide.

You can also use the radio as a D-Star gateway or hotspot, using the LAN connection and connecting directly to the internet as a gateway or using a D-Star handheld to talk through the radio to a connected gateway. It is a rather expensive way to achieve this compared to buying a cheap DV dongle, but it is possible.

Satellite mode

A few other radios have offered full duplex cross-band satellite mode operation with forward and reverse tracking of the VFO frequencies. But locking the VFOs together in this fashion can't correct for the difference in Doppler shift between the 70cm band and the 2m band. Most satellite operators prefer to use satellite tracking programs, which control the radio through the CI-V or CAT interface to automate Doppler correction and provide transponder tracking. The IC-9700 is capable of full-duplex satellite operation with forward or reverse tracking with the added advantage of being able to easily move either the main (downlink) or the sub (uplink) VFO independently and then lock the VFOs together again. This means that for the first time, you really can consider manually managing the Doppler shift using the radio alone. Of course, the option of PC control via the CI-V interface is still available. I successfully configured the radio to work with SatPC32 and others have reported success with MacDopplerPRO. One feature not found on all 'satellite capable' transceivers is that you can listen to the uplink frequency and the downlink frequency at the same time.

Front panel

The front panel layout is identical to the IC-7300 although the function of some of the controls is different. There are volume, squelch, and RF Gain controls for each receiver and a button for selecting a 'call channel' or the Digital Repeater D-Star mode. There is also a separate button for enabling tone squelch. Many functions and all of the menu commands are accessed via the 4.3in colour TFT touchscreen. The display is particularly clear and bright, retaining readability well under bright lighting. Backlight level is adjustable, and you can select either a black or blue background. Band, mode, filter selection, meter selection, and VFO / memory functions are all selected by touching the appropriate areas on the display. Each soft key icon brings up a group of selectable options.

A row of hardware buttons along the bottom of the display provides access to the main menu settings, function settings, the spectrum scope, and 'quick' selection of a number of parameters.

Pressing the MULTI knob allows you to set adjustable functions such as transmit power level and microphone gain. Rotating the MULTI knob either steps through the memory channels or it adjusts the VFO frequency by the pre-determined tuning steps. The display shows a large number of status indicators and functions. According to the Icom manual, there are 33 indicators on the display and that is without considering the panadapter spectrum scope and waterfall display. Both receiver frequencies are shown continuously with dual bar meters for signal strength or various selectable transmit functions. The VFO display changes to the transmit frequency while you are transmitting. Simultaneous metering of multiple transmit functions can also be selected. A very comprehensive 'Set' mode allows tailoring of an enormous number of functions. These are all accessed via the touch screen display with nested menu items. The menu structure is in plain language, which is so much easier than dealing with the cryptic codes used by earlier transceivers. You have a choice of English or Japanese language. A keyboard is displayed on the touch screen when alphanumeric data needs to be entered. This can be in either a full QWERTY or a 10-key format and makes data entry very straightforward.

Tuning is very smooth and easy using the 47mm diameter rotary control. The normal tuning rate is either in 10Hz or 1Hz steps, or you can select fast tuning rates from 100Hz per step up to 100kHz per step. The tuning rate speeds up if you rotate the VFO knob more quickly. A quarter speed tuning rate can be selected for fine tuning on CW and data modes.

The microphone connector is the standard 8-pin format and there is a 3.5mm headphone jack. An SD memory card slot is provided for storing various items such as received and transmitted audio files, voice memory stores, RTTY decode logs, memory contents and setup data. Screen images can also be captured as PNG or BMP files. User-supplied SD or SDHC cards up to 32GB can be used, but the SD card does not have to be very big. I have data files for three different Icom radios on a single SDHC card and the files only take up 30MB in total.

Rear panel

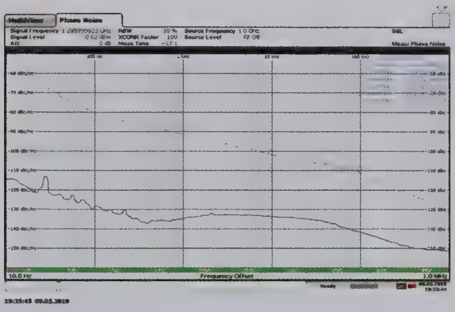
The rear panel includes a SO-239 antenna socket for the 2m band and Type-N connectors for the 70cm and 23cm bands. There is an SMA connector for the connection of a 10MHz high stability oscillator. See my comments later about oscillator stability.

An Ethernet connector is provided for connection to a LAN. It can be used for remote control of the transceiver using the RS-BA1 V2 software and if you want to turn the radio into a D-Star gateway or hotspot and for the DD (digital data) mode. It is also used to connect to an NST time server on the internet, keeping the clock display very accurate.

The type B USB 2.0 port is used for CI-V computer control and for audio, or 12kHz IF, connections between the radio and your PC. One cable carries all the control and audio data. The radio establishes two virtual COM ports and an audio codec that looks like a soundcard to digital mode software. The addition of a Type A USB port on the rear panel would have enabled the use of an external keyboard that would be a boon for users of the CW memory keyer and built-in RTTY decoder. Those functions are severely limited by the inability to enter a remote station's callsign.

A 3.5mm stereo phono 'Key' jack is provided for the connection of a CW key or paddle. There is a standard Icom accessory jack, a legacy CI-V 'Remote' jack, speaker jacks for the main and sub receivers (mono!), and a data jack for connecting an external GPS receiver. This is for location data, not for a GPS disciplined oscillator.

There is no transverter output or external monitor output on the rear panel. A transverter output would have been handy for anyone wishing to use the radio use as an exciter and converter receiver for the microwave bands and would have been especially welcomed by satellite operators wanting to use the new QO-100 geostationary satellite. The ability to plug in an external monitor may be missed by some, although it is of very limited appeal on the IC-7610. There are no separate ALC or PTT jacks for connection to a linear amplifier, but these signals are available on the ACC jack.



The IC-9700 has excellent transmitter phase noise results. Thanks to Rohde & Schwarz GmbH & Co KG for making the FSWP instrument available to Conrad Farlow, PA5Y, for the transmitter phase noise measurements.

Receiver features

Both receivers are identical and all receiver functions such as filtering or noise rejection etc are duplicated and separately adjustable by touching the top (main) or bottom (sub) receiver panel on the display. Incremental tuning (RIT) is adjusted with the Multi knob and auto-tuning is provided on CW. The same button can turn off the AFC when the transceiver is in the in FM or DV mode.

There are 99 regular memory channels and two scan edge channels for each of the three bands. Memory access is very straightforward. Each memory channels can be assigned a name up to 16 characters in length and this is quick and easy with the on-screen keyboard. A separate 'quick access' memo-pad stack for 5 or 10 frequencies is also included. There are also two Call channels per band for quick access to your most often used frequencies or repeaters. A host of scanning functions are also provided. Filtering functions are fully adjustable. A 'FIL' touch-button on the display scrolls through three pre-set IF filter bandwidths with separate settings for each mode. Sharp and soft passband shapes are available. Twin PBT allows either side of the filter passband to be shifted independently, shifting or narrowing the overall shape to assist in combating adjacent channel interference. A manual notch filter operates at IF inside the AGC loop preventing desensitisation with strong carriers. It has excellent depth with wide, medium, or narrow width settings. A separate auto-tuning notch filter operating at audio removes multiple tones effectively.

An adjustable noise reduction system reduces background noise and improves readability in certain situations. A separate noise blanker eliminates pulse-type noise from car ignition and other sources. Three separate AGC time constants are selectable from a menu of 13 different values (0.1 to 6s) and are set separately for all modes except FM. The AGC can also be switched off.

The receiver audio response can be tailored independently for each mode. The high-pass and low-pass roll-offs can be adjusted separately and the bass and treble responses cut or enhanced.

Transmit features

Transmit functions for SSB include a speech compressor, VOX, and a transmission monitor. The transmitter audio filter bandwidth may be set to adjustable wide, mid, or narrow settings. In addition, the bass and treble responses can be cut or enhanced separately for each voice mode in a similar fashion to the receive audio. The voice keyer stores eight pre-recorded audio messages and operates in any of the voice modes including the voice-data modes. Each message has 90 seconds of recording time. Operation and recording are the same as on the IC-7300.

On CW there is the usual provision for full and semi break-in with adjustable drop back delay. The keying envelope rise and fall times are adjustable between 2 and 8ms and an additional 'transmit delay' is selectable for each band to accommodate slow switching linear amplifiers or other accessories. A CW message keyer is included operating over the speed range 6 – 48 wpm with adjustable weighting and a variety of keying paddle arrangements. Eight memories will each store up to 70 characters each with a provision to send an automatically incrementing serial number and auto-repeat after a time delay. In full break-in CW mode, relay clicking is noticeable on the 2m band, which has a PTT relay. It is silent on the 70cm band, which has PIN dode PTT switching, and quiet on the 23cm band (which uses a much smaller relay).

The RTTY mode includes a built-in RTTY decoder and an eight message keyer similar to the CW one. The message keyers are identical in configuration and operation to the ones in the IC-7300.

FM mode operation includes automatic duplex selection, CTCSS tone repeater access, tone squelch, and repeater split frequency operation.

For digital mode operation using external software, there are three data modes. The modulation input can be taken from the USB cable, microphone socket, or accessory socket. The USB-D mode is used for AFSK modes such as FT8, JT65, and PSK. The FM-D mode would be used for Packet and APRS modes.

Computer software

The IC-9700 can communicate with most PC based digital mode and satellite tracking programs via the USB cable and you can use the RS-BA1 v2 remote control program to control it remotely via an Internet connection. There is a server built-in, so a PC connection is not required at the radio end. Icom has released a

The IC-9700 is a delight to use on the bands.

free programmer called CS-9700 that allows you to easily edit and add to the thousands of memory slots available in the radio, including the scan edges and calling channels. You can also edit the satellite memories and the GPS memory bank. The Icom manual states that the radio comes with the list of worldwide D-Star repeaters pre-loaded, but mine was supplied blank. Repeater lists for the IC-9700 can be downloaded from http://downloads.d-staruk.co.uk/. The radio can store 2500 DV repeaters, divided into 50 groups. You can also set most if not all of the menu settings and the text for the RTTY and CW message keyers. The program allow you to import channel data from .csv files. Other commercial programs to control the radio are available.

Frequency stability

If you are not using narrow bandwidth digital modes or using the radio with an upconverter or downconverter for operation on the microwave bands, there is no issue with the frequency stability of the IC-9700. You may notice some frequency drift after transmitting SSB on the 23cm band, but this is easily compensated for by using the RIT control. The small amount of drift experienced on the 2m and 70cm band is insignificant. Although the radio frequency drifts quite rapidly as it cools down with the fan running after a transmit period, the frequency always remains well within the specified ±0.5ppm variance quoted in the Icom specification. The stability of the radio while receiving is excellent. After leaving the radio on, but not transmitting, for 30 minutes, I measured a frequency error of 13Hz at 1242MHz, which is an outstanding result.

However, this rapid frequency drift after transmitting does make reception of weak signal digital modes such as JT65 and WSPR a challenge. The problem arises when you use modes that transmit for 30 seconds or a minute and then receive during the next time period. Radios with the latest firmware release (V1.11) have the option of connecting a high stability 10MHz GPS reference clock or rubidium frequency standard to the 10MHz Reference Input connector on the rear panel. This external reference 'governs' the internal TXCO, significantly improving the overall frequency stability of the transceiver. Without the GPS reference signal, I measured 30Hz of frequency drift in the minute following a one-minute transmission at full power on the 70cm band. With the GPS reference signal, this was reduced to about 5Hz of frequency drift. I am hopeful that this may be further improved in future firmware releases.

Measurements

The full set of measurements is in the measurements table opposite. The receiver sensitivity is very good especially with a preamplifier enabled. The preamplifiers have about 12dB of gain on the 2m and 70cm bands and 5dB on the 23cm band. This difference does not matter as the radio is also more sensitive on the 23cm band. There is also an optional 10dB front-end attenuator for each receiver.

The S-meter is fairly linear, each S-unit indicates a 2.5dB increase in signal strength. There were no spurious responses noted. Like many SDR receivers, the dynamic range is excellent. Strong signal performance is limited by ADC overload. With the preamplifier off, a single input signal 10kHz away from the receiver frequency will trigger an (OVF) ADC overload alarm at an input level of -9dBm (S9 +78dB). With on-frequency signals, the front-end AGC operates, reducing input to the ADC; you can apply a signal at up to +10dBm (S9 +97dB!) without reaching the overload point. When really strong signals are present anywhere on the band you should turn down the RF gain control or switch in the front-end attenuator. Enabling IP+ removes low-level intermodulation products, improving the reciprocal mixing dynamic range (RMDR) by about 1.5dB, but degrading the receiver sensitivity by about 3dB.

I did a test to see how well you can see weak signals on the waterfall display. The radio will show a line at an input level just above the minimum discernible signal (MDS) sensitivity level, around -130dBm. However, this will be masked by received noise when you connect an antenna. Still, you should be able to see any signal that you can hear. The receiver passband has a very flat response when set to the 'sharp' setting. The 'soft' SSB filter had a slight curve across the passband as well as a softer roll-off. The 'soft' 500Hz CW filter is flat with a slower roll-off than the sharp filter and you can definitely hear the difference.

The transmitter power was well within the 5% tolerance of most good power meters. When testing RF power at UHF frequencies and above, you must take into consideration the loss in your coax cables. The stated results are as measured at the antenna connectors. The level of the 2nd harmonic was acceptable and there were no other measurable spurii. Transmitted phase noise was good. There were no differences in the test results when the GPS reference clock signal was disconnected.

On the air performance

The IC-9700 is a delight to use on the bands. Although there is a high degree of customisation available, the transceiver is very easy to use. I had QSOs on 23cm SSB simplex, 2m FM simplex, FM repeaters and D-Star. It is rather subjective, but I feel that the receiver audio sounds cleaner and crisper than my old VHF/UHF radio. The performance was excellent, and I had very good reports about the quality of my transmitted audio. The channel filters, notches, noise blanker and noise reduction system all performed well. I set the radio up for satellite operation and was able to hear the CW beacon on XW-2C, but I don't currently have suitable antennas to achieve a satellite contact. The touchscreen display is very responsive, and the image is crisp and clear. Tuning is smooth and memories are quick and easy to access.

Conclusions

The IC-9700 is a very impressive radio with some great features and superb performance. It is an all-mode VHF/UHF tri-bander with direct sampling technology, comprehensive D-Star capability, and full duplex Satellite mode. It's an ideal radio for the serious VHF/UHF enthusiast. Wow!

Acknowledgements

I would like to thank Adam Farson, AB4OJ for the RMDR measurement data and Conrad Farlow, PA5Y for the transmitter phase noise data. I also wish to thank Rohde & Schwarz GmbH & Co KG for making the instrument available for phase noise measurements. My thanks too to Icom UK for checking the differences between the radio supplied in New Zealand from that obtained in the UK.

The IC-9700 is available in the UK from all good Icom stockists, with a recommended pricearound £1800.

Icom IC-9700 Measured Performance

Reciever Tests

MDS (minimum discernable signal)	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
MDS preamp on	-143.4dBm (0.02µV pd)	-143.9dBm (0.01µV pd)	-144.1dBm (0.01µV pd)
MDS preamp off	-131.1dBm (0.06µV pd)	-131.8dBm (0.06µV pd)	-138.7dBm (0.03µV pd)
MDS attenuator on	-121.9dBm (0.18µV pd)	-122.5dBm (0.17µV pd)	-128.8dBm (0.08µV pd)
Noise figure (preamp on)	3.6	3.1	2.9

[NF = MDS + KTo 174dBm + 10 log(500)]
[CW mode 500Hz BW]

Signal visible on the waterfall	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
Waterfall image	-130dBm (0.07µV pd)	-130dBm (0.07µV pd)	-143dBm (0.02µV pd)
Waterfall image preamp on	-150dBm (0.01µV pd)	-150dBm (0.01µV pd)	-150dBm (0.01µV pd)

[CW mode 500Hz BW]
Note that incoming signal noise will degrade this performance when the radio is connected to an antenna.

FM sensitivity	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
12dB SINAD FM	-113.8dBm (0.46µV pd)	-113.48dBm (0.47µV pd)	-121.7 dBm (0.18µV pd)
12dB SINAD FM preamp on	-125.4dBm (0.12µV pd)	-125.2dBm (0.12µV pd)	-125.5 dBm (0.12µV pd)

[FM modulation 1kHz tone at 3kHz deviation. Receiver 15kHz BW]

SSB sensitivity	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
10dB S/N	-116.9dBm (0.32µV pd)	-116.5dBm (0.33µV pd)	-124.8dBm (0.13µV pd)
10dB S/N SSB preamp on	-129dBm (0.08µV pd)	-128.6dBm (0.08µV pd)	-129.8dBm (0.07µV pd)

[SSB mode 2.4kHz BW]

S-meter calibration	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
S-meter S9 reading	-86.7dBm (10.34µV pd)	-87.3dBm (9.65µV pd)	-94.8dBm (4.07µV pd)
S-meter S9+20 reading	-66.4dBm (107.02µV pd)	-66.9dBm (101.04µV pd)	-74.4dBm (42.61µV pd)

[Preamp off, CW 500Hz BW. The S9+20 readings indicate an accurate 20dB increase in received signal]

RMDR (reciprocal mixing dynamic range)	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
RMDR at 1kHz spacing	92dB	84dB	72dB
RMDR at 2kHz spacing	97dB	90dB	75dB
RMDR at 5kHz spacing	102dB	96dB	79dB
RMDR at 10kHz spacing	104dB	98dB	82dB
RMDR at 20kHz spacing	106dB	100dB	84dB

RMDR measurements performed by Adam Farson, AB4OJ

Receiver phase noise (calculated)	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
Phase noise at 1kHz spacing	-119dBc/Hz	-111dBc/Hz	-99dBc/Hz
Phase noise at 2kHz spacing	-124dBc/Hz	-117dBc/Hz	-102dBc/Hz
Phase noise at 5kHz spacing	-129dBc/Hz	-123dBc/Hz	-106dBc/Hz
Phase noise at 10kHz spacing	-131dBc/Hz	-125dBc/Hz	-109dBc/Hz
Phase noise at 20kHz spacing	-133dBc/Hz	-127dBc/Hz	-111dBc/Hz

For a 500Hz bandwidth, Phase Noise in dBc/Hz = -(RMDR + 10LOG(500))

Receiver filter response	
2.4kHz SSB filter	Sharp receiver pass band is flat from 300 to 2700Hz
2.4kHz SSB filter	Soft receiver passband is curved with a 6dB rolloff at 300 and 2700Hz
500Hz CW filter	Sharp receiver pass band is flat with -3dB points at 450 and 950Hz
500Hz CW filter	Soft receiver passband is flat with a softer rolloff and -3dB points at 438 and 957Hz

TRANSMITTER TESTS

RF Power	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
RF Power (watts)	102W	75W	10.1W*

Power on 23cm measured with Rohde & Schwarz analyser.
[CW/RTTY mode 100% power setting]

Transmitter harmonics	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
2nd Harmonic	-59.4dBc	-64.6dBc	-51.4dBc
3rd Harmonic	-71.7dBc	-75.7dBc	

Transmitted phase noise	**2m band**	**70cm band**	**23cm band**
Phase noise 100Hz	-100.5dBc	-91.4dBc	-80.5dBc
Phase noise 1kHz	-118.8dBc	-109.2dBc	-91.6dBc
Phase noise 10kHz	-121.3dBc	-111.6dBc	-101.8dBc
Phase noise 100kHz	-129.4dBc	-119.9dBc	-111.4dBc
Phase noise 1MHz	-140.1dBc	-130.5dBc	-131.9dBc

Transmitter phase noise measurements performed by Conrad Farlow PA5Y at 100% power level.
Unaffected by reference clock input

2 tone 3rd order TX IMD	**2m band (146.2MHz)**	**70cm band (435.5MHz)**	**23cm band (1296.2MHz)**
3rd	-41dB	-30dB	-35dB
5th	-50dB	-42dB	-41dB
7th	-60dB	-56dB	-47dB
9th	-65dB	-57dB	-51dB

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ARRL method. Two tones at -6dB below single tone 100% power level

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YAESU

2624 WATTS

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ICOM

2916 WATTS

Base

IC-7610 HF/50MHz SDR base transceiver £3499.95

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Mobile

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166 WATTS

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83 WATTS

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133 WATTS

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249 WATTS

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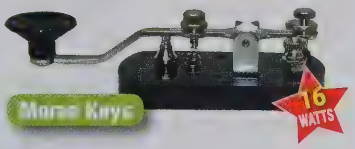

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Antenna secrets

– the electron and radiation

Introduction

I have been intrigued for many years about how exactly an antenna radiates. How does it do this? For years I had assumed that the magnetic and electric fields of an antenna somehow combined to make an electromagnetic (EM) wave. But try as I might, I could not fathom out how, if the frequency was high enough, a piece of wire would suddenly acquire radiation resistance and start to radiate energy. My phasor diagrams just didn't work.

Reluctantly, I started to look at what happens microscopically – the behaviour of electrons – and here lies the answer. Without this particle we would not have antenna radiation and you may be surprised that, even at Droitwich, the tiny electron is all-important. This is the story of how the electron causes radiation.

Basics

First, the obvious question – what are radio waves? Like light and X-rays they are an example of electromagnetic radiation. They carry energy away from a source; the intensity (watts per square metre) falls off with the square of the distance ($1/D^2$). They are *transverse waves*, where the vibration is *across* the direction of motion and consist of an electric wave and a magnetic wave, vibrating at right angles to each other, but in phase. The field strength of each of these waves falls off with the inverse of distance ($1/D$) and they travel at the speed of light. And as we know, they can have wavelengths from millimetres to miles.

By contrast, the field from a magnetic pole falls with $1/D^2$, which is more rapid, so it is not so useful for communication. The electric field from a charged object, such as a metal plate on a wooden pole, behaves similarly. Communication with the island of Flatholm was established using these induction methods over a distance of about 3 miles, but radiated waves soon showed they could go much further, and four years later, in 1901, they crossed the Atlantic. But before I can talk about antenna radiation, we must notice that an antenna is an electric circuit – really just a slightly lossy transmission line, so we need to understand that first.

'J J' and the electric current

In 1897, working at Cambridge, J J Thompson discovered the electron, the smallest 'piece' of electricity. It is negatively charged and has almost negligible mass. A number of electrons buzz around the positive nucleus of every atom. In a metal, the outer electrons are free to wander off and the material is full of an electron gas, or plasma. It is very dense, not at all like the wispy clouds of electrons in a valve. In a penny, for instance, the total charge from all these free electrons is huge, maybe 10,000 coulombs (remember that 1 coulomb = 1 amp per second, or 1 farad at 1 volt). As a result, if we want to pass a few milliamps through the penny, the electrons need only move very slowly to provide the current, maybe a millimetre an hour. But we are told that electricity travels at the speed of light, so how is this?

If you turn on a gas tap, gas emerges at once. The gas molecules don't travel at high speed in the pipe – they just drift along – but a pulse (a downward step function) travels back towards the gas company. It is telling all the gas molecules upstream to start moving slowly towards the cooker. The pulse is actually a sound wave, ie a mechanical pressure wave, a *longitudinal wave*, travelling in the gas as its medium. After the initial pulse, the increased flow continues. When you switch off, a high pressure wave travels along the pipe, telling the molecules upstream that you have turned off.

With electricity, when you close a switch, a pulse travels at nearly the speed of light to the generator, telling it to work harder. Once the steady flow has started, the electrons supply the energy by just drifting along. They never have to go fast and do not travel at the speed of light. The pulse is a mechanical wave of compression in the electron gas, and it travels at nearly the speed of light. During the pulse, the electrons just give a little wiggle: they do not themselves have to travel at the speed of light; the wave does that job. I must also mention that the compression wave is mainly carried by electrons near the surface, due to skin effect.

Transmission lines: speed of the wave on a wire

You might have heard a shunting engine bump a goods train – a wave travels along the train, rattling the couplings. The speed of the wave is controlled by the elasticity of the buffers and the inertia, or mass, of the trucks. In our wire, the inertia of the electrons – their reluctance to move – is mainly because they have to build a magnetic field around themselves once they are moving.

When the electron is moving, because it is charged, it is equivalent to a current and it has a magnetic field. When we accelerate the electron we are putting energy into a magnetic field and we have to push harder to supply the energy. This inertia effect is another name for inductance; it makes it hard to start a current and hard to stop it. Mass and inductance both contribute to inertia, but at radio frequencies the inductance effect is by far the larger.

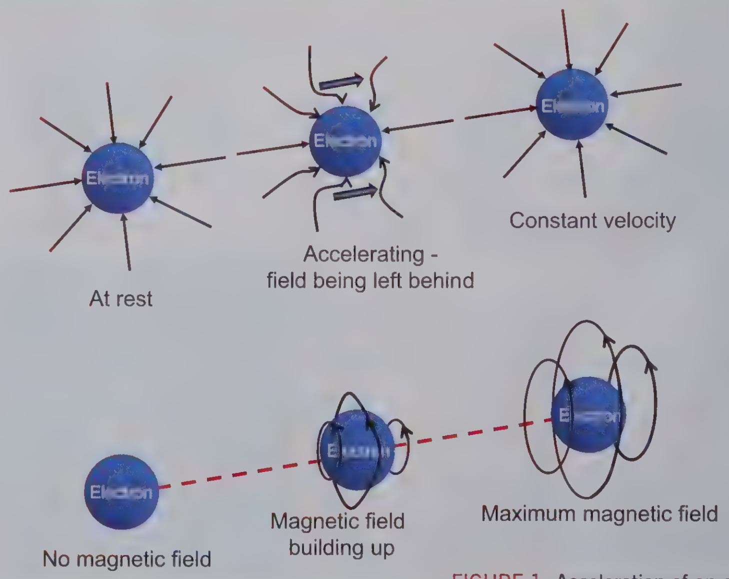

FIGURE 1: Acceleration of an electron.

The strength of the inertia (the magnetic field) is controlled by the *permeability* of free space. The strength of the elasticity (caused by electric repulsion when electrons pack together) is controlled by the *permittivity* of free space. The electron is not at all its own master – the mechanical forces controlling its motion are decided by the properties of free space.

In summary, we can say that electrons only make small movements, but enable a mechanical pulse to travel along a wire at nearly the speed of light. Like a sound wave, it is a longitudinal wave and as it travels it carries with it electric and magnetic fields.

If the wavelength is long and the wire is short, we do not, however, see much radiation. But if the wavelength is short and the wire is long, then we do. Now we can look at why this is.

The secret of radiation

Not only did 'J J' discover the electron, he also suggested how radiation works **[1]**. Each electron has lines of electric force sprouting out of it in all directions and extending out to 'infinity'. (Actually we don't notice any static electricity from the electrons in a penny because it is cancelled by the equal number of lines of opposite polarity coming from the nuclei). If an electron is moving at constant velocity, its field lines just move bodily along with it, as shown in **Figure 1**.

If we now suddenly accelerate the electron, the lines try to follow, but at a distance far from the electron they cannot immediately know what has happened, so they continue as before. The lines near the electron are now tracking its motion, but those further away are not. This causes a kink in the field line, as seen in Figure 1. The kink travels outwards at the speed of light and carries energy away as radiation. You may think that the opposite field from the nucleus would cancel the effect, but the nucleus is heavy and cannot accelerate quickly, so the kink is *not* cancelled out. The kink has a field component parallel with the motion and this is the *radiated electric field*. J J tells us that it is acceleration, not speed, that causes radiation.

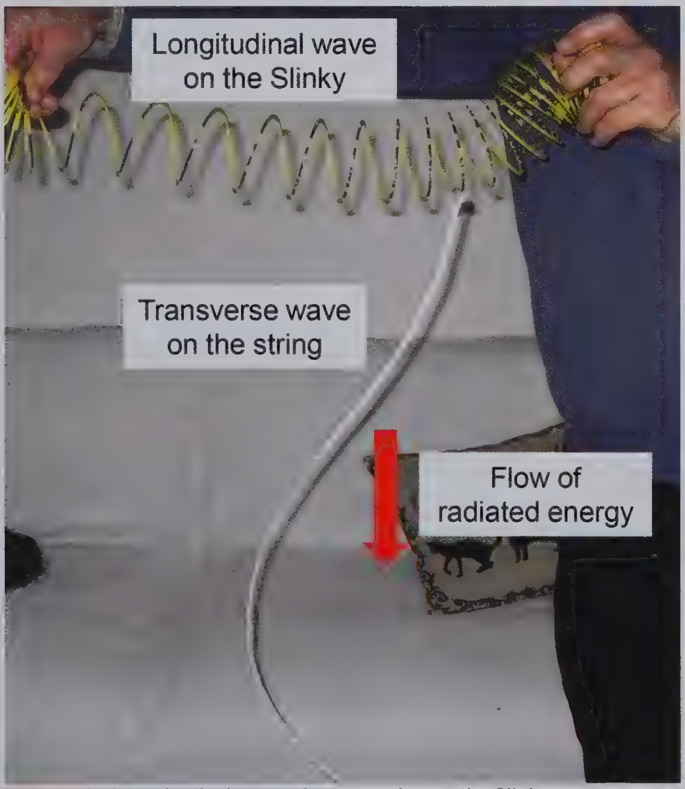
Longitudinal wave on the Slinky
Transverse wave on the string
Flow of radiated energy

FIGURE 2: A longitudinal wave of compression on the Slinky creates a transverse wave on the string.

The two fields

An electromagnetic wave has two in-phase components, electric and magnetic. The one resulting from the kink is the electric radiation field. Acceleration does not in itself seem to cause the radiation of the magnetic field component, but Maxwell suggested that a varying electric field produces a magnetic one, and this is how the *magnetic radiation field* springs up as the wave passes an observer.

Energy relations

When we accelerate the electron and a kink develops, the field lines of the kink are pulling back against us. As we push the electron we are doing work against a resistance that is called the *radiation resistance*.

Part of our work goes into the radiated field, and travels away as the kink, to be lost for ever. After the acceleration is finished, the electron will be travelling faster, so it will have more energy, and this is a second part of the work we have expended. The moving electron has energy stored in a magnetic field, and in antennas we are familiar with this as the *magnetic induction field*.

If we arrest the motion of the electrons with a resistor at the end of the antenna, their energy is lost, but if we use, say, a metal plate, the energy will be transferred to the capacitance and will then be temporarily stored as an *electric induction field*.

Radiation from a wire

The mechanical impulse that we can send along a wire causes all the electrons in turn to give a little jiggle, and in this way we can cause all of them to radiate. Remember that there are a lot of them – the electron charge in a metal is enormous – so a slight movement is enough. Notice that a *longitudinal* mechanical wave running along the wire produces a *transverse* radiated wave – a radio wave.

An antenna is very much like a transmission line that is slightly lossy. Suppose, for instance, that the antenna has a characteristic impedance of 750 ohms. It might have only 75 ohms of radiation resistance, so if we terminate with a 750 ohm resistor we waste 90% of the power. If, however, we make the antenna series resonant, we see the 75 ohms at the sending end but we have a lot of stored reactive energy in standing waves. The energy radiated each cycle will only be 10% of that stored. This means that the structure has a high Q-factor, and has a bandwidth of only 10%.

Slinky

A good model to show radiation is the Slinky toy, seen in **Figure 2**. If we stretch it out, we can send a compression wave along it by moving our hand. Each point on the spring moves just a little, like our electrons, yet we see a travelling wave go rapidly down the Slinky.

We can visualise paper dots glued to the Slinky at intervals along its length to represent electrons and we can see that each of them executes a little sine wave motion as the wave passes. In a real case, each electron may move by less than its diameter (which is around 10^{-16}m).

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davidjohnsumner@gmail.com

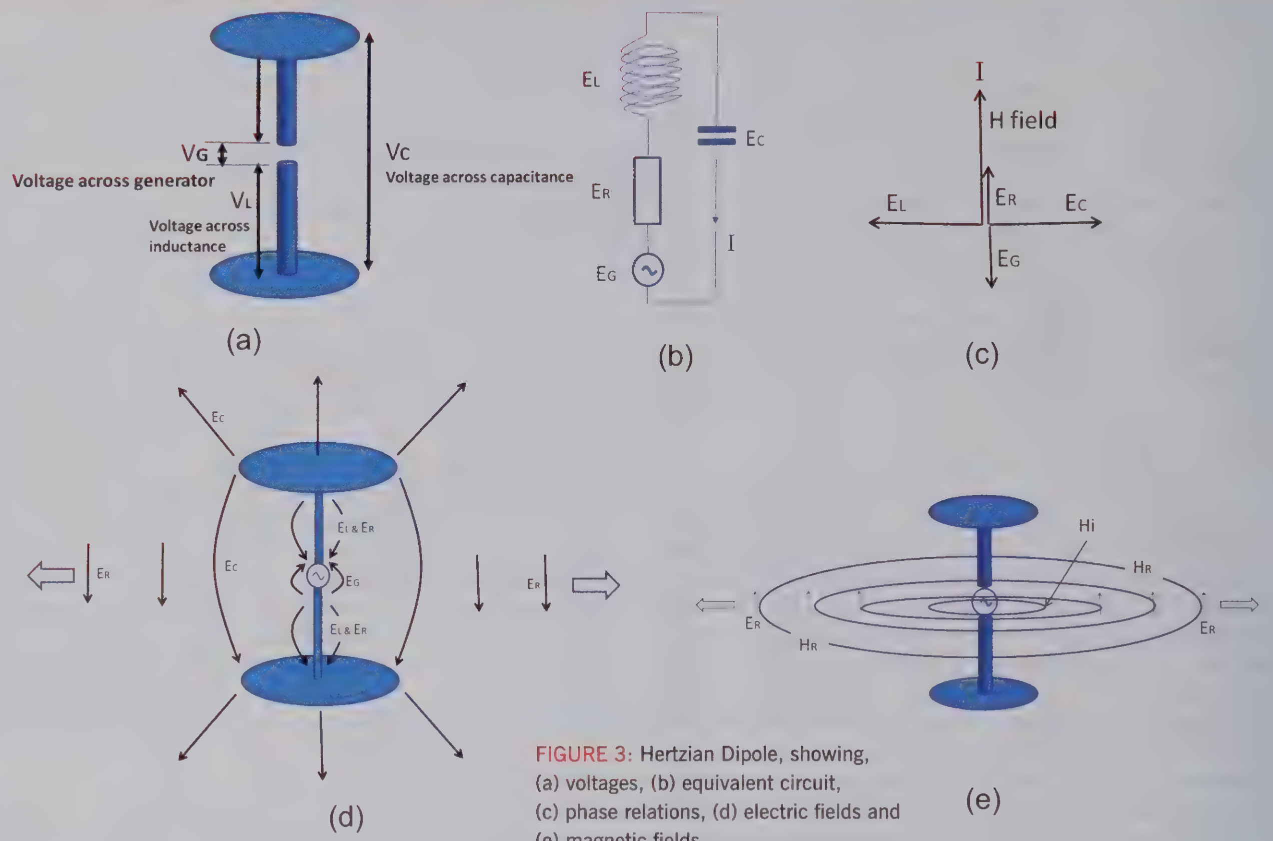

FIGURE 3: Hertzian Dipole, showing, (a) voltages, (b) equivalent circuit, (c) phase relations, (d) electric fields and (e) magnetic fields.

To simulate radiation, we can hang a string from one of the dots. As the longitudinal wave passes, a transverse wave is created on the string, like cracking a whip. The string represents the static field line from an electron in the wire, and the waves we see on the string are the kink we mentioned earlier. The wave on the string represents radiation; it is a *transverse wave*, different from the longitudinal wave on the Slinky; it takes energy away from the Slinky.

Hertzian dipole

We can summarise our knowledge by referring to **Figure 3a**, which shows the dipole used by Heinrich Hertz. It is driven at the centre and the ends are terminated with metal plates. At resonance, it is similar to the lumped equivalent circuit shown at **Figure 3b**. In that illustration,

E_R is the radiated electric field, the field developed across the radiation resistance.

E_L is the electric induction field across the antenna inductance – the electron inertia.

E_C is the electric induction field developed across the antenna capacitance – the springiness restraining the electrons.

H_R is the radiated magnetic field, caused by the moving radiated electric field.

H_L is the magnetic induction field caused by the velocity of the electrons.

H_C is the magnetic induction field caused by current flowing in the antenna capacitance.

I is the antenna current.

The electric fields are shown in **Figure 3c**. The generator has to push the electrons in the wire to accelerate them and they oppose this action. Firstly, the kink is pulling against the generator, creating the radiation resistance with its associated electric field. Another electric field arises across the inertial inductance of the electrons. I have called these two fields E_R and E_L. At the ends of the wire, the kinetic energy of the electrons is collected on the metal plates and stored as capacitive energy. This creates an electric induction field E_C. The generator has a local field E_G, which is in the opposite direction to its load – this is so the voltages round the circuit add up to zero. The electric radiation field (E_R) arises on the wire from the acceleration of the electrons, and continues outwards without spreading very much to start with, but then falls off as 1/D. This field creates the magnetic radiation field, Hr.

In **Figure 3d** we see the magnetic fields. Close to the antenna the magnetic induction field (H_i) is strong, caused by the velocity of the electrons after acceleration – in other words, the current. The magnetic induction field of the wire and radiation field are *in phase* and cannot be distinguished near the antenna. The magnetic induction field arising from the current flowing in the capacitance is opposing that from the wire. As we have a series circuit, there is only one current to consider flowing in the resistance, inductance and capacitance.

Summary

We have now seen how antenna radiation can be explained in terms of accelerating electrons. We find longitudinal compression waves in the electron 'gas' in conductors, and these then create transverse waves of radiation. A Slinky can be used to show the mechanisms involved. We can see that an antenna is like a slightly lossy transmission line and contains a large amount of energy stored in its induction fields.

Reference

[1] Bekefi, George, *Electromagnetic vibrations, waves and radiation*. MIT Press, ISBN 978-0-262-52047-8, page 255.

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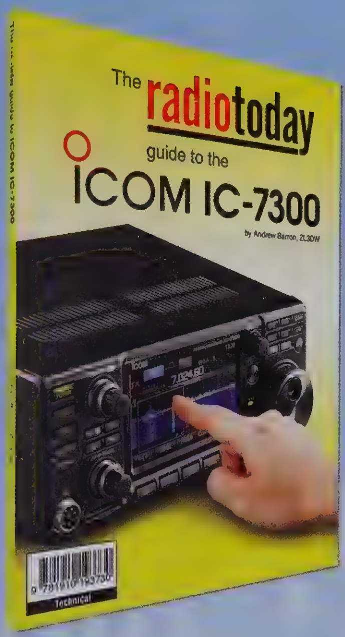

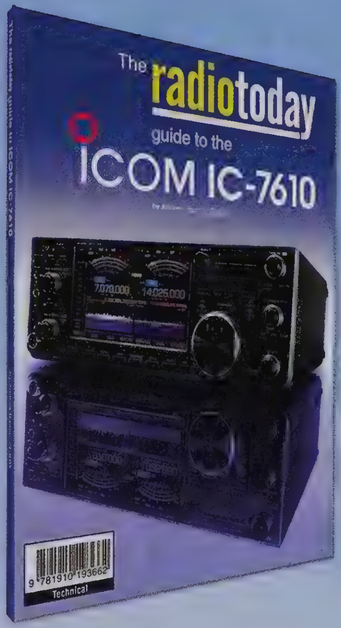

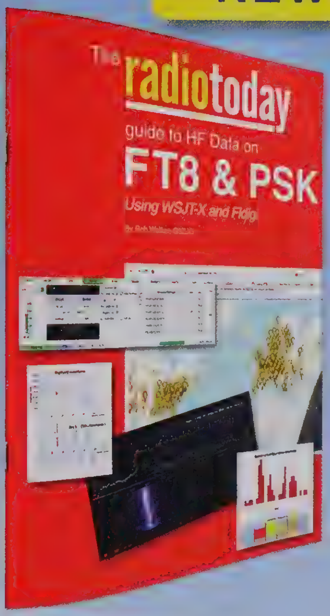

radiotoday guide to the Icom IC-7300

By Andrew Barron, ZL3DW

The Icom IC-7300 radio is one of the best-selling radios of recent years but, as an owner or potential buyer, are you aware of all the features it has and how to achieve the potential of the radio? The *Radio Today guide to the Icom IC-7300* sets out to provide exactly what you want.

This book highlights the myriad of options available. The *Radio Today guide to the Icom IC-7300* doesn't duplicate the manuals that describe each button, function, and control but is a "how to do it" book with easy to follow step by step instructions. The Icom IC-7300 has many settings and controls to learn. The inclusion of the 'panadapter' or 'band-scope' marks out the radio as being excellent value but there is a lot more. The radio has VOX (voice operated transmit switching), a built-in antenna tuner, coverage of the 6m (50MHz) and 4m (70MHz) amateur radio bands. And it has a voice keyer, RTTY and CW keyer memories, and an RTTY decoder.

The *Radio Today guide to the Icom IC-7300* provides invaluable reading for every owner or potential purchaser.

Size 176x240mm, 160 Pages
ISBN: 9781 9101 9373 0
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radiotoday guide to the Icom IC-7610

By Andrew Barron, ZL3DW

Within a few short months the Icom IC-7610 radio, became a 'best seller'. This SDR - based radio has simply become the measure by which other radios are being judged. Andrew Barron, ZL3DW, an acknowledged SDR expert, sets out in this book to highlight the myriad of options available to users.

On opening the box of the Icom IC-7610, you may be surprised by how many settings and controls there are. This should not deter you as this is where this book comes in. From the first steps with the panadapter display and its 'FIX' spectrum display mode, this book guides you. The biggest advantage that the IC-7610 offers over its rivals at a similar price level is the two completely independent receivers, so Andrew explains the changes this makes to the way you operate the radio. The touchscreen controls are explained so you get to know the radio through using it and through delving into every control and menu setting.

The IC-7610 is a truly exceptional radio and if you are interested in purchasing one, this guide provides invaluable reading.

Size 174x240mm, 160 pages
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radiotoday guide to HF data on FT8 & PSK

using WSJT-X and Fldigi

By Rob Walker, G3ZJQ

Many radio amateurs are now turning to HF data on FT8 and PSK. This new book offers the very latest advice on how to set up your station.

radiotoday *guide to HF data on FT8 & PSK* starts by explaining how to set up a modern digital modes station using just a PC and a transceiver. Covering the WSJT-X 2.0 software including FT8 contest modes for weak signals, the book also includes the Fldigi 4.0 freeware for the myriad of other HF digital modes available. The book even details the new Fox and Hounds mode. You will find an in-depth discussion of modern digital modes from the very practical side, to the technology itself. Concepts such as Forward Error Correction (FEC), Cyclic Redundancy Checks (CRC) and Fourier analysis that at first appear complex are explained. radiotoday *guide to HF data on FT8 & PSK* ensures that the requirement of advanced mathematical skills before you can decipher this technology has been removed. The book explains in a simplified way using diagrams and terms familiar to most radio amateurs.

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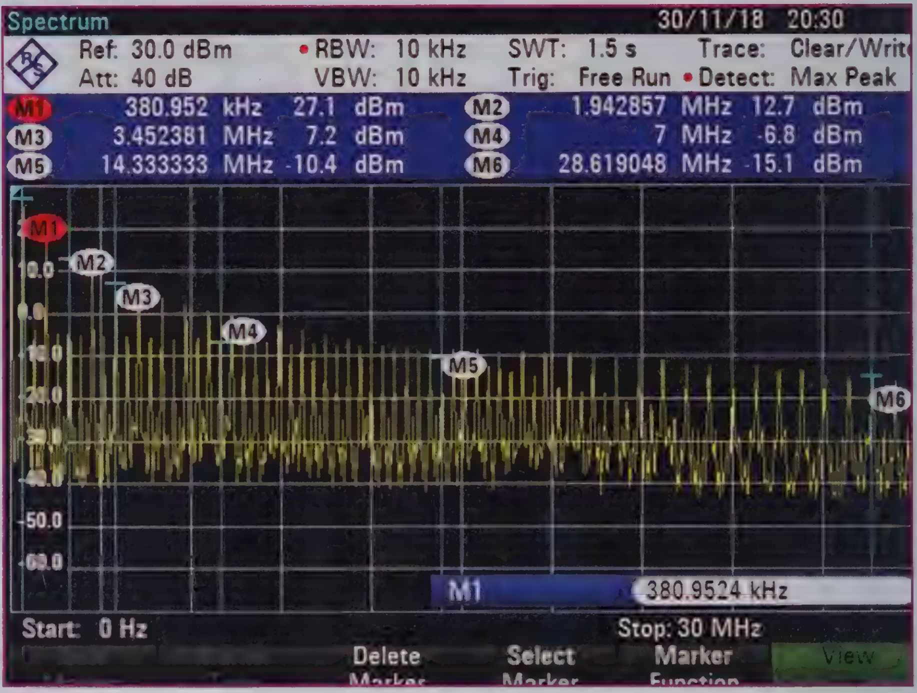
What are you doing about interference?

What are you doing about interference is one of the most common questions addressed to the RSGB.



Spectrum 30/11/18 20:30

Ref: 30.0 dBm
Att: 40 dB
RBW: 10 kHz
VBW: 10 kHz
SWT: 1.5 s
Trig: Free Run
Trace: Clear/Writ
Detect: Max Peak

M1 380.952 kHz 27.1 dBm
M2 1.942857 MHz 12.7 dBm
M3 3.452381 MHz 7.2 dBm
M4 7 MHz -6.8 dBm
M5 14.333333 MHz -10.4 dBm
M6 28.619048 MHz -15.1 dBm

M1 380.9524 kHz

Start: 0 Hz
Stop: 30 MHz

FIGURE 1: Tests done on a Media TV Bed where the foot of the bed has a mechanism to raise a built-in flat screen TV that uses a Class D audio power amplifier.

Radio Frequency Interference (RFI) is making contacts more difficult for signals close to or below the RFI level.

The EU EMC directive aims to prevent RFI from equipment stopping other equipment *"operating as intended"*, it also requires equipment to have *"a level of immunity"* so it can work *"without unacceptable degradation"*. When electrical equipment is placed on the market, it has to show compliance with this directive and then displays a CE mark. So, we need to demonstrate that our problem is caused by too high a level of RFI rather than inadequate immunity of our receiver.

Often equipment is designed and tested to standards to prove it meets the required levels of interference and immunity. Regulators (including Ofcom) can stop equipment being placed on the market if it is not compliant. Unfortunately, the standards may not provide the level of protection we need for some of our experimental communication, which may be working at very low levels (often below the background levels at our stations). In other cases where unintended radiation occurs, there is no specification for maximum levels, particularly for radiated emissions at HF. The situation is worse when equipment is interconnected to make systems because often the resulting RFI is greater than the sum of the parts; particularly true if unscreened or unbalance interconnections carry common mode currents that cause radiation from the connecting wiring (which may act as a highly-effective resonant antenna).

What can be done?

Let us assume that the equipment is compliant, has been interconnected using *"good engineering practices"* yet it is still causing us interference – what can be done? UK Radio Regulations (RR) made under the Wireless Telegraphy Act requires that equipment does not cause *"Harmful Interference"* (HI). This is not us saying that our communication is being harmed; it has a specific definition: HI *"endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service..."*. First point to note is that it is a service suffering HI not a particular communication using a specific frequency or mode. Ofcom may suggest a change in frequency or mode and sometimes a different band to mitigate against RFI. Our problem is that we often cannot take a measurement and compare it with a specified limit to prove the equipment is non-compliant.

Let us further assume that Ofcom decide to act then they can require interfering equipment be turned off for 28 days to give time for remedial action. However, Ofcom state *"their interventions will be evidence-based, proportionate, consistent, accountable and transparent in both deliberation and outcome"*. This means it is difficult to get them to take action, particularly to use their enforcement powers (https://tinyurl.com/ofcom-emc).

Help with interference

The RSGB EMC Committee provides advice and assistance to Members having RFI problems. We also help Members prepare their cases if they wish to escalate their problems. We have helped Members approach Ofcom, their service providers, their MPs / MEPs, the Ombudsman and we have repeatedly raised our Members' problems with the relevant authorities. We have also used the Spectrum Defence Fund to gain advice from an eminent counsel. So what do we propose next? We know a number of you have taken actions yourselves, which we may not know about. We also have a large number of cases we do know about. In order to analyse all these cases, we plan to set up a working group under the EMCC to study the various outcomes and propose a strategy for further action. The EMCC existing strategy will also be included as input. If you wish to input to this work or join the working group, please email emc.chairman@rsgb.org.uk

What can be done in the meantime? If you can identify and locate the source of interference and persuade the equipment owner to cooperate you may be able to solve your problem. We stress care must be taken in approaching neighbours whom you suspect may own the offending equipment. The EMC helpdesk will help you with advice on how to do this. The EMC web pages also contain a lot of advice on how to find the interference, locate it and confirm that it is the cause (https://tinyurl.com/rsgb-emc2). Advice on mitigation techniques that might reduce the RFI impact are also on the RSGB website (https://tinyurl.com/rsgb-emc1). We are investigating VDSL problems with Ofcom and we work with Openreach to identify Members who could have their RFI reduced by eliminating line problems. We are also active in standards preparation to help prevent problems with equipment at the design stage.

We hope you can help!

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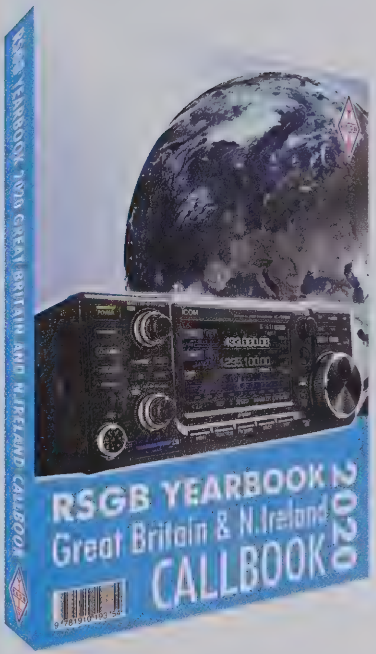
Book Review

RSGB Yearbook 2020

Edited by Mike Browne, G3DIH


RSGB YEARBOOK 2020 GREAT BRITAIN AND N.IRELAND CALLBOOK
RSGB YEARBOOK 2020
Great Britain & N.Ireland
CALLBOOK

It's surprising how often I consult the *RSGB Yearbook* in my 'day job'. It is my go-to reference for so many things, ranging from reliable callsign lookup to club information to band plans and even dates when various radio equipment reviews appeared in *RadCom*. And I know from talking to people that anyone who has their own copy of the *Yearbook* also finds it very useful. What makes it so good? Quite simply, the fact that it covers so much ground so comprehensively. There's information about almost every aspect of our fascinating hobby.

As it's the *RSGB Yearbook* there is, as you'd expect, a fair amount of detail on the RSGB structure and services. You'll find name and contact details for the RSGB Board members, Regional Representatives, the chairs of RSGB committees, HQ staff, the QSL Bureau and so forth. There's an article explaining how the QSL Bureau works and a list of all Bureau sub-managers. You'll also find advice on diverse topics including revalidating your licence, planning, EMC, reporting on-air bad behaviour and so much more.

Quite a lot of the information is covered in a series of useful articles. Everything from datacomms, ARDF, IOTA, amateur satellites, microwaves, propagation (including the outlook for 2020), a detailed contest calendar and list of awards, how to use the Locator system, trophy presentations, advice on operating abroad, details of the Radio Communications Foundation, and there's a new feature on amateur television.

Featured Clubs get their own section, covering all shapes and sizes from (inter)national groups like CDXC and BYLARA, many, many local clubs and even some online-only organisations. Then there's a Region-by-Region listing of useful information such as a comprehensive list of RSGB Regional Representatives and their Deputies, the area's clubs (including contact details and, usually, where and when they meet), repeater groups and exams centres, including contact details for each Exam Secretary.

By far the lion's share of the *Yearbook* is devoted to the section that I think most people will use most often: the callsign listings. Here you'll find the authoritative list from Ofcom of all active callsigns and, in most cases, the name and address of the holder. 'Details withheld' callsigns are listed in a separate section: they're just as valid, but the owners have chosen not to allow Ofcom to share their details. (There's information on how to contact Ofcom to let them share your details and get into subsequent callbooks; RSGB cannot make individual amendments to the callsign data). All of the UK's Permanent Special Event callsigns are listed, as are the Special Contest Calls that some of the most enthusiastic contesters have applied for. Usefully, as normal, the main callsign information is also listed in surname and postcode order, giving even greater flexibility to the lookup process.

At 576 pages, the *RSGB Yearbook 2020* is even bigger than in previous years and is packed full of up-to-the-minute useful information. Accept no substitute: I think every amateur should have a copy.

210x297mm 576 pages ISBN: 9781 9101 9375 4
Non Members' Price: £19.99, RSGB Members' Price: £16.99

Deluxe Logbook & Diary 2020

Published by RSGB

2020
Deluxe
logbook & diary

The *RSGB Deluxe Logbook & Diary* also contains a wide variety of useful reference information, plus (as the title suggests) a year-long diary with plenty of space for notes against every day.

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This spiral-bound book lies nicely flat on the table, making it exceptionally easy to use: it always stays on the page you want (unless of course your shack is extraordinarily draughty!).

At the same price as the regular RSGB log book, the *Deluxe Logbook & Diary* contains far more information and represents excellent value.

Size 210x255mm, 80 pages ISBN: 9781 9101 9378 5
Non Members' Price: £5.99, RSGB Members' Price: £4.99

Callseeker Plus 2020

Published by RSGB

2020
CALLSEEKER

This is *the* comprehensive electronic callbook for checking European callsigns. Not only does it contain the official UK list of callsigns as supplied by Ofcom, there are callsign data sets from many other European radio societies.

The popular Eurocall user interface is straightforward, requires no installation space and has extremely modest hardware requirements, running very happily on anything from an old Windows laptop onwards. Just type in a callsign and you will be rewarded with the name and address for that station. A variety of print options are available, including 'instant' QSL cards. It's also possible to search on other criteria such as name or location. Navigating through the search results is quite intuitive.

Callseeker Plus 2020 also includes the 172-page 'information' section of the *RSGB Yearbook 2020* as a PDF file, exactly as it appears in the printed book, thus bringing the benefit of on-screen reading and word searches etc. All in all it's incredibly useful for the 'real' amateur.

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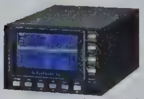
Fully built and tested: **£839.95**
Self Build Kit: **£799.95**

P3 Panoramic Adaptor

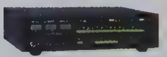


A great companion for the K3 series. It gives you a live view from 2kHz to 200kHz ollus waterfall.
Kit: **£819.95** Built: **£849.95**

Roofing Filters for K3

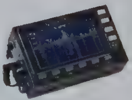
Easy fit and sharpens up your receiver selectivity
All in stock - check our web

W2 Digital VSWR Meter



Reads FS down to 2W. Choice of 200W or 2kW sensor 1.8 - 54MHz. True PEP
Built: **£359.95**

PX3 Panoramic KX3 Display

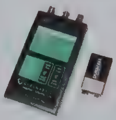


A great companion for the KX3. Similar spec. to the P3 above
Kit: **£659.95**
Built: **£699.95**

SS30DV Power Supply

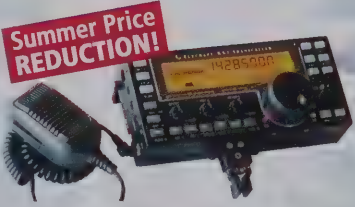
Elecraft's high quality base PSU. Fixed 14V DC to allow for DC drop on power lead to give 13.8V at Rig terminal
Built: **£159.95**

T1-A QRP (20W) Auto



Ideal for FT-817/8. 160m - 6m. Handles coax and most end fed wires!
Built: **£169.95**

Elecraft KX3 160 - 6m, 15W



- KXAT3......ATU..........£239.95
- KXFL3 ......Filter £189.95
- KXBC3......Timer £99.95
- KXPD3......Key...........£159.95
- DC Lead.....................£11.95
- 2m Transvert............£309.95
- 4m Transvert............£309.95
- MH3.........Mic £79.95

There is something very special about the KX3. It out-performs any similar transceiver and almost all of the base stations. You can run it at 100mW or increase to any power up to 15W (a bit less above 20m). You can add 2m or 4m, Add a narrow roofing filter or auto ATU. No other rig can match it.

Kit: ~~£1099~~ **£1059.95**
Built: ~~£1149~~ **£1109.95**

KXPA100

100W PA for:
- KX3 • KX2
- FT-817
- FT-817/818 option £11.95

Kit: **£899.95** Built: **£949.95**

Elecraft KX2 Go Portable with Elecraft

Summer Price REDUCTION!

Mic & paddle key are optional extras

2 Year Warranty

* 80m - 10m 10 Watts
- All modes + Data

~~£899.95~~ **£879.95**

- Only 13 oz (0.3kg) - ideal for portable and handheld operation
- Internal 2.6 Ah, 11 V Li-ion battery option
- Internal wide-range ATU option
- Current drain as low as 135mA
- Built-in microphone and speaker
- Advanced DSP provides dual watch, noise reduction, noise blanking, autonotch, stereo audio
- Versatile software-defined radio (SDR) architecture
- Operates in data modes (PSK31/RTTY) with or without a PC
- New KXPD2 compact keyer paddle

PACKAGE DEAL KX2 + Mic. + KX-33 AC PSU **£989.95 (Save £70!**

KPA500 HF Amplifier Solid State 160m-6m

Ready Built, Tested and calibrated
.... **£2649.95**
Supplied as solderless kit to build yourself **£2449.95**
24 Month UK Warranty

The Small DESKTOP Solution for a BIG Signal

• Bands	160m to 6m with RF sensed Band Switching
• Power	500W All Modes with 10 Minutes Key Down
• Switching	Full QSK Silent Solid State TR Switching
• Drive	30-40W for full Output Power
• Monitoring	Full LCD monitoring of key parameters
• PSU	Built-in 240 / 115V AC
• Cooling	Twin low noise Thermo. Fans
• Protection	Over Driving and High VSWR protected
• Size	10.2 x 27.4 x 25.5cm (H.W.D.)
• Weight	11.8kg

The KPA500 is a solid state amplifier that requires no tuning and is instantly available from AC mains switch on. It is conservatively rated and topicality will provide 600W of PEP SSB. As well as offering fast QSK switching for CW, it also offers totally silent transmit / receive switching. Its low profile design results in a package that is likely to be around the same size as your main transceiver; maybe even smaller! Band changing is achieved by front panel selection, but you may as well rely on the auto RF sensed band select feature. You can also enjoy the KPA500 with any modern HF transceiver. All you need is a PTT connection and an RF connection. No ALC is needed. Add around 6dB to your signal - all bands

Visit our New Portsmouth Shop

Have a play with our demo radios and have a free coffee while you are here! The showroom is an Aladdin's cave full of goodies - and our knowledgable staff are here to advise you.

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ICOM TOP RADIOS

Each of these radios built from the ground up and featuring the very latest SDR technology. Now leading the design trends in Japanese Ham radio.

IC-7300

£50 Voucher ENDS 10/09/19

The IC-7300 has quickly become a piece of ham radio history. A marker by which the competition is judged. The fastest selling radio of 2017 and still going strong, replacing all those old radios that many hams gave clung to for years. It's a great performer and great value. 160m - 4m. 100W Max. **£1199.95**

IC-7610

£50 Voucher ENDS 10/09/19

The new IC-7610 transceiver is now a reality. Few can fail to be impressed with the advanced technical promises. And nobody should be disappointed once their new radio arrives. We have good orders in for this radio and so will be happy to bring your dreams to reality. And if you need any additional items to go with your new radio then we are sure that we can delight you. 160m - 6m. 100W **£3499.95**

IC-9700

£50 Voucher ENDS 10/09/19

The IC-9700 brings together the three popular VHF bands and puts them into one very high tech. box. The large screen, packed with information, will be a welcome addition and copies their HF range in presentation and flexibility. Top of the feature list is SDR employed on both 2m and 70cms, with all the benefits that go with this. And there is no extra charge for the 23cms down converter which will be the icing on the cake for many. The recent trade demonstration showed us just what a great radio this is. Call us today for a quote. **£1799.95**

Other Transceivers

IC-7100	100W All Mode with remote head	£999.95
IC-R8600	10kHz - 3GHz Comms. Receiver	£2489.95
IC-R30	Handy All Mode Digital scanner	£569.95
ID-4100E	2m / 70cm D-Star & FM Mobile	£295.95

Icom Outdoor Radio

D-51E Plus
22m & 70cm

- 5W Dual Band
- FM and D-Star
- Free Downloads
- GPS Receiver
- Access Mode
- Terminal Mode
- AM & FM Receive

The Icom ID-51E Plus 2 is Icom's latest and mpst advanced handy transceiver. It has a host of features that will keep you in touch locally and world wide! **£379.95**

ID-5100E D-Star

Here we have the feature packed mobile that delivers 50W of dual band power. Offering both FM and D-Star with programmable features that enable worldwide communication. **£574.95**

IC-2730E

This radio is a rugged workhorse. 50W of FM on 2m and 70cm. Keypad mic. and remote head. It has AM and FM receive for out of band reception such as airband and marine. **£289.95**

Small Garden - Hotel - Holiday Home? Let's Enjoy HF with MyAntennas

65ft or 130ft

- VSWR: Typical 1.5:1
- Power: 1kW
- Fully assembled
- 50 Ohm feed
- SO-239
- Resonant on listed bands

Here we show it with the transformer inside the window and the wire run down the garden.

This End Fed system really solves lots of problems in an efficient way. It's the back garden antenna that really works. No traps and no heavy feeder dangIng down - just a single wire. Run it out in a straight line or as an inverted L. Feed it as an inverted V with a single lightweight mast like our 40ft self supporting Spider Pole. Or just bend it around the garden! Let's enjoy HF!

EFHW4010	65ft long 1 kW 40-20-15-10m 1kW	£149.95
EFHW8010	130ft long 1 kW 80-40-20-15-10m + WARC bands	£159.95
EFHW4010+	72ft long 80-40-20-15-10m	£179.95
OJV-80	Mod kit for EFHW4010 adds 80m (8ft long)	£29.95
Pole Mount 30	30mm (max.) Pole mount for Matching Unit	£19.95
Pole Mount 50	50mm (Max) Pole Mount for Marching Unit	£19.95
SpiderPole-12	Rugged 12m telescopic fibre glass pole	£99.95
CMC-130-3K	Common Mode Choke 3kW	£89.95

Check out our YouTube Channel

YAESU Part of our Range

FT-3DE Digital Handheld
High resolution screen with bandscope display. Digital and analogue operation on 2m & 70cms. Features wide band receive and has GPS reception. A great travel radio. **£379.00**

FT-DX1200 HF - 6m 100W + ATU
Here we have a serious base station at a great price. Its used by many Hams around the world and will give years of pleasure. **£909.95**

FT-DX3000 HF - 6m 100W + ATU
The FT-DX3000 owes a lot of its features from the FT-DX500, a class leader DXers and Contesters love it - so will you! **Call Sales for a deal! £1299.95**

FT-DX5000 HF - 6m 200W + ATU
PRICE DOWN!
This radio needs little introduction. It's the current Flag Ship of the Yaesu HF range. 200W is 3dB gain on all bands **£3199.95**

FT-991A HF - 70cms 100W max
This is a real top seller. It's the one radio that you can put on the desk and enjoy HF and VHF. Includes ATU. **£1189.95**

Yaesu FT-DX101D

Now top of the Sherwood list for SDR HF Technology. When you buy from us you also get a 3-Year Yaesu UK warranty. The new Yaesu FT-DX101D embraces SDR in an interesting way. You have full SDR technology, but they have added a selectable superhet front end to provide optimum dynamic range and front end selectivity. The full colour touch screen offers variable bandwidth up to 1MHz, with clever screen presentation options and a rear panel HDMI output for an external display. **£3149.00**

FTDX101MP 200W
FTDX101D
IN STOCK!
YAESU

Peter Waters G3OJV, operates the first FT-DX101 to come into the UK.

Full range of Yaesu products stocked. Call for Quotes

YAESU Cash Back

FT-991A	£1189.95	- £90 =	**£1099.95**
FT-891	£599.95	- £45 =	**£554.95**
FT-818ND	£599.95	- £45 =	**£554.95**
FTM-7250	£219.95	- £15 =	**£204.95**
FT-70DE	£169.95	- £15 =	**£154.95**

AOR Receivers Japan

AR-DV1
Multimode digital demodulation receiver featuring wideband reception, D-STAR, Yaesu Fusion, DMR and much more. **£1289.95**

AR-8600 MkII
A high performance all-mode communications receiver that covers the frequency range from 100kHz to 3GHz. As such it covers the complete radio spectrum. DC lead included. **£629.95**

AR-DV10
The AR-DV10 is the most advanced digital handheld receiver covering covering 100kHz - 1.3GHz. The latests firmware upgrade now adds comprehensive trunk monitoring. **£899.95**

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Sign up to our WEEKLY DEALS at **hamradiostore.co.uk** for exclusive deals and latest news

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DUAL Antenna Range from DUAL

Superbly engineered by YU1CF

A range of well engineered Yagis, optimized for performance! 1kW rating and some Dual Band models. In stock - call us now!

2/70cms

4m

Dual Band 2/70cms

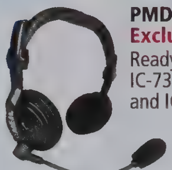
2m

70cms

23cms

Model	Description	Price
Dual Band 6/4		
PA5070-7-3	6m 3el 4m 4 element 3m boom	£199.95
PA5070-11-6	6m 5el 4m 6 element 6m boom	£259.95
4M Yagis		
PA70-5-3	4m 5 element Yagi 3m boom	£139.95
PA70-6-4	4m 6 element Yagi 6m boom	£179.95
Dual Band 2/70cms		
PA144-432-13-1.5	2m 5 element 70cms 9 element	£119.95
PA144-432-17-2	2m 6 element 70cms 12 element	£149.95
PA144-432-19-3-2C	2m 7 element 70cms 12 elements	£215.95
PA144-432-21-3	2m 7 element 70cms 14 element	£199.95
2M Yagis		
PA144-5-1.5	2m 5 element Yagi 1.5m boom	£94.95
PA144-6-2	2m 6 element Yagi 2m boom	£119.95
PA144-8-3	2m 8 element Yagi 3m boom	£135.95
PA144-9-5A	2m 9 element portable 4.67m	£174.95
PA144-11-6BG	2m 11 element Guyed 5.72m	£199.95
PA144-12-7BGP	2m 12 element Yagi	£259.95
70cms Yagis		
PA432-8-1.2R	70cms 8 element Yagi 1.2m boom	£89.95
PA432-14-3	70cms 14 element Yagi 3m boom	£145.95
PA432-23-6	70cms 23 element Yagi 6m boom	£199.95
PA432-30-8BG	70cms 30 element Yagi 8m boom	£269.95
23cms Yagis		
PA1296-13-1R	23cms 13 element 1m Rear mount	£99.95
PA1296-18-1.5AR	23cms 18 element 1.5m Rear mount	£139.95
PA1296-36-3RG	23cms 36 element 3m RG Balun	£169.95
PA1296-36-3UT	23cms 36 element 3m Teflon Balun	£189.95
PA1296-70-6RG	23cms 70 element 6m RG Balun	£225.95
PA1296-70-6UT	23cms 70 element 6m Teflon Balun	£239.95

Heil Sound in Stock!



PMD-IC
Exclusive!
Ready wired for IC-7300, IC-9700 and IC-7610
£116.95

Proset-6 Headset
Headset only........£128.95
+ AD-1 Interface ..£154.90
Icom with 8-pin....£162.95

Proset-6 Headset
Headset only........£239.95
+ AD-1 Interface ..£265.90
Icom with 8-pin....£259.95

AVAIR VSWR Power Meters - Needle Sharp Readings!

Accurate with Peak Power Readings

Model	Description	Price
AV-201	1.8-160MHz 5-20-200-1000W	£59.95
AV-400	140-525MHz 5-20-200-400W	£59.95
AV-601	1.8-525MHz 5-20-200-400W	£74.95
AV-1000	1.8-1300MHz 5-20-200-400W	£89.95
AV-20	Mini 1.8-200MHz 30-150W	£49.95
AV-40	Mini 140-470MHz 15-150W	£49.95

AV-1000 - Great for IC-9700 - Check it Out!

Speaker Mics

A convenient and economical way to add a speaker mic to your radio. Fitted with rotating rear clip and curly lead

Model	Description	Price
QS-112Y	Yaesu / Icom 2-Pin	£18.95
QS-112K	Kenwood 2-Pin	£18.95
QS-112GP	Motorola 300 series	£19.95
QS-112Y4	Yaesu single non screw	£18.95
QS-112Y4S	Yaesu single screw	£18.95

Hustler HF Verticals

4BTV
40m - 10m 4 Band vertical that will handle full legal power and can be ground mounted
Height is 6.52m. £209.95

5BTV
The ever popular 5-band model that covers 80m to 10m. This is a great backyard antenna that can be ground mounted.
The height is 7.64m
£269.95

6BTV
This antenna is identical to the 5BTV above buthas the 30m band added. Again it handles full legal power and stands 7.3m high. £289.95

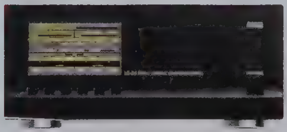
All antenna are rated at 1kW

HyGain & Cushcraft Antenna Deals

Model	Description	Retail	Offer
A-103	10MHz Add-on kit for A3-WS Yagi	£209.95	£189.95
ARX-2B	Ringo Ranger 2m Mono Band Vertical	£109.95	£84.95
A-743	A3S Add on kit for 7MHz and 10MHz	£219.95	£179.95
AR-270B	2m / 70cms Vertical 2.3m High	£196.95	£169.95
26B3VPK	Stacking Kit for 2 x A13B2	£175.95	£149.95
R-7000TFK	TRap field kit for R-7000	£173.95	£99.95
ARX-2	2m Ringo Vertical Antenna	£79.95	£69.95
TEN-3	3 Element 10m Yagi	£310.95	£269.95
A6270-13S	6m, 2m and 70cm 13 Element Yagi	£289.95	£249.95
GRK-88	Ground Radial System for DX-88	£134.95	£89.95
AV-6104	160m Range Extender for 43dt Vertical	£99.95	£89.95
A-719B	70cm 19 Element Yago 4.1m long	£249.95	£199.95
DX-88	10-12-15-17-20-30-40-80m 1.5kW Vertical	£489.95	£399.95
DB-46M8EL	4m6m Dual Band 8 Element Yagi	£269.95	£239.95
LFA-2M12EL	2m 12 Element Yagi	£299.95	£279.95
LFA-2M16EL	2m 16 Element Yagi	£399.95	£369.95
LFA-2M9EL	2m 9 Element Yagi	£229.95	£199.95
VB-66DX	6m 6 Element Yagi 1.5kW	£299.95	£279.95
AV-620	6-10-12-15-20m 1.5kW Vertical	£459.95	£399.95
VB-216SAT	Satellite 2m 16 Element Yagi	£249.95	£199.95
AR-10	10m Vertical 5.36m High	£114.96	£99.95
MA5V	6m 6m Add on kit for MA5V	£49.95	£39.95
A50-5S	6m 5 Element Yagi	£219.95	£189.95
MA-6VA	6-10-12-15-17-20m Compact Vertical	£352.95	£329.95
ASL-2010	Log Periodic 13.5 - 32MHz	£999.95	£799.95
A3WS	12m & 17m 3 Element Yagi	£549.95	£499.95
A50-6S	6m 6 Element Yagi	£359.95	£329.95

Acom HF Amplifiers

Acom 600S



Here is a solid state amplifier that delivers 600W of output effortlessly. No tune up needed. Includes built-in AC supply and operates 160m to 6m.
£2399.95

Acom 1000S

Here is an amplifier that will attract those who prefer to use tubes. It's a high performance amplifier that uses a single 4CX1000A tube. This provides 1kW output from 1.8MHz to 54MHz. The pi-network output enablers band edge operation where VSWR rises . A complete desktop design.
£2299.95

Diamond TOP SELLERS!

Model	Description	Price
Base Station Antennas		
X-30	2m 70cms Vertical 1.3m	£39.95
X-30N	2m 70cms Vertical 1,3m	£59.95
X-50N	2m 70cms Vertical 1.7m	£52.95
X-300N	2m 70cms Vertical	£99.95
X-300	2m 70cms 3.1m	£89.95
X-5000	2m 70 & 23cm 1.8m	£123.95
V-2000	6m 2m 70cm 2.5m	£89.95
X-510N	2m 70cm 5.2m	£119.95
F22	2m Vertical 3.2m	£64.95
F-23	2m Vertical 4.8m	£89.95
D-777	Civil & Mik Airband	£59.95
Discone antennas		
D-130	25 - 1300MHz Tx	£99.95
D-3000	50MHx - 3GHz Rx	£99.95
Mobile antennas		
AZ-510FX	Dual Band 0.92m	£46.95
AZ-910	6m 2m 70cm 0.95m	£49.95
NR-770HB	Dual band 1m	£34.95
SG-7000	2m 70cm 100W 0.5m	£54.95
SG-7500	2m 70cm 1.05m	£54.95
SG-7900	2m 70cm 1.58m	£89.95

call: **01702 204965** email: **sales@wsplc.com**

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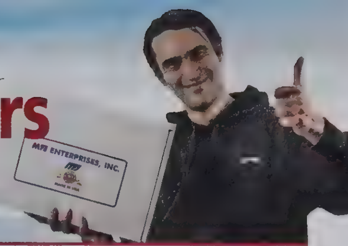
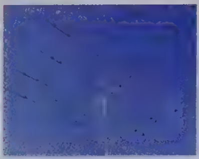
Latest Versions - Full UK Warranty


MFJ ENTERPRISES, INC.

ANTENNA TIME - 'Spring' into Action!

Cushcraft MA-6B



Full details on our web site

£699.95

Compact 6 Band Yagi. 20m - 6m 1.5kW, 2 elements per band, 2.3m Boom.

MFJ-1836 Cobweb

This is a great antenna for the small garden.

£249.95

6 Bands 20m - 6m rated to 300W. 9ft per side with 6ft turning radius. Includes ferrite balun.

MFJ-1836H .....1.5kW version......£299.95

Cushcraft A3S 1.5kW

The classic triband Yagi that will handle up to 1.5kW.

£739.95

HyGain TH-3MkIV 20-15-10m

- 5.8dB Average
- Gain: 25dB F/B ratio
- Boom: 14ft
- L. Element 27ft

Here we have the classic tri-band Yagi, used the world over. A rugged antenna.

£589.95

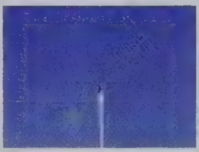
MFJ-1846 Hex Beam

6 Bands 20m - 6m with 2 elements on each band.

£589.95

This antenna will handle 2kW yet will fit into many gardens. Turning radius 11ft and forward gain approx 6dB.

MFJ-1789 40m-2m



Here's a compact rotary dipole that will fit in most gardens and covers 40m to 2m.

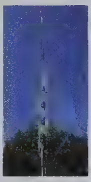
£395.95

AV-12AVQ 20m-10m

It's a classic and a great way to get on the the DX bands. Can be ground mounted and will handle up to 1kW. Self supporting.

£159.95

Hygain DX-88 80-10m



t's one of our best selling ham radio verticals, not least because it covers so many bands.The eight bands covered are 80-40-30-20-17-15-12-10m. Will handle up to 250W on all bands.

£429.95

MFJ-1886X Low Noise Receiving Loop

If you have a high noise level the MFJ-1886X could be the answer. Magnetic loops have an inherent low noise performance, and used by LF DXers. The idea is that you use the loop for reception and your main antenna for transmitting.

- 200kHz - 30MHz
- Low Noise Balanced pre-amp.
- Bias=T DC feed up the coax
- Fully weather proof
- Light weight easy installation
- Aircraft grade alloy

£239.95

MFJ Loops for Attics or Small Gardens

NFJ loops are less than 1m diameter but are very efficient and the solution for those who have littles space. The package invludes the controller that adjusts the tuning of the loop via DC down the coax feeder.

MFJ-1782X....10MHz - 30MHz......................£479.95

MFJ-1788X....7MHz - 21MHz.......................£529.95

MFJ-939 Plug & Play Auto ATU

Here is an auto ATU with models dedicated for Yaesu, Kenwood, Icom and Alinco. Each one comes with a lead that plugs directly into your radio that provides power and operating signals back to the ATU. Tell us the model of your radio when ordering.

MFJ
MFJ Compact IntelliTuner
AUTOMATIC ANTENNA TUNER
200 Watts SSB / CW
TUNE
ALT
POWER
MODEL MFJ-939

£176.95

Ready to go!

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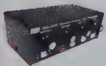

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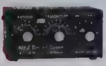

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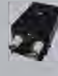

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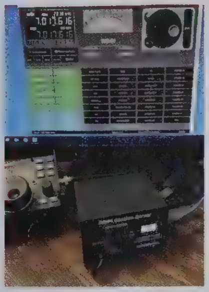

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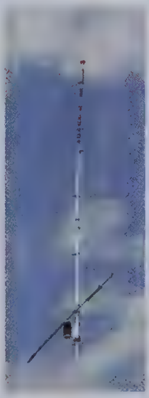

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Anytone AT-D878UV Plus 144/432MHz DMR/Analogue handheld transceiver

Coverage of Digital Mobile Radio (DMR) is quite new to *RadCom*, although not, I know, to many readers. Having said that, it's perhaps worth spending a few moments looking at DMR in general before diving in to have a look at the AT-D878UV Plus.

There are three digital voice systems in regular amateur VHF/UHF usage, with another two more occasionally used. They are all mutually incompatible – at least without some clever stuff in the middle, which is beyond the scope of the current article.

Icom brought D-Star to market first (and although Icom is synonymous with D-Star, it's in fact an open standard). DMR networks then came to be developed, with a number of amateurs who'd used DMR commercially, starting to think about applying it to amateur use. Finally, Yaesu brought their own System Fusion to market, of which the digital component is C4FM. The two other less commonly used systems are NXDN and P25 – however, you almost certainly won't run into these protocols in day-to-day amateur use. It took me a while to realise that it's very unlikely that any one of the systems will 'win-out' and be a sole digital presence on VHF/UHF.

If you are thinking about which of the systems to try out, then one of the factors in your decision – possibly the main one – is likely to be 'what are the people around me using'? If there's a DMR repeater in your locality, that might be a good place to start. If you've got more than one system in use in the surrounding area, lucky you! But seriously, in that case, talk to the locals and try and find out about the use of the systems locally and what appeals to you most of all. If you've got no repeaters around you at all, then all is not lost, but you might need a digital hotspot of some variety to connect to the different networks. That's something for another time. For what it's worth, because of the use of DMR in commercial networks, typically, DMR radios are cheaper than either D-Star or Fusion radios.

AnyTone
C02
2345453<-Mike
St.Albans
Hertfordshire
United Kingd..
235 UK WIDE
Menu Zone List
P1
P2

The Anytone AT-D878UV Plus is a dual band (144 and 432MHz) DMR and FM handheld.

Digital Mobile Radio

This article is about DMR though, so let's concentrate on that. The really good thing about DMR is that it can carry two conversations at the same time in the same 12.5kHz channel. This happens by use of Time Division Multiple Access (TDMA) that separates the two data streams by 30ms. These two data streams are known as time slots; time slot 1 and time slot 2. A repeater can carry traffic on both time slots at the same time, but your transceiver can't, even if you could yourself!

Of course, you can use your DMR radio simplex and work someone else in simplex

Tim Kirby, G4VXE
longworthtim@gmail.com
Twitter: @g4vxe

range. By convention this is normally done on Talk Group 9. What's a talkgroup, I hear you ask! The excellent DMR for Dummies website **[1]** says:

'Talkgroups can exist for many purposes. You can have talkgroups for countries, states, counties, regions, cities, special interest groups etc. Just about any group of DMR users could have a talkgroup assigned to them if they wished to organize traffic that they can all monitor and take part in, without having to talk to each other one by one'.

So, as well as a local talkgroup, your DMR repeater will cover other talkgroups, including, probably, several worldwide talkgroups, a UK-wide talkgroup and other talkgroups that the repeater keeper or group have decided to carry.

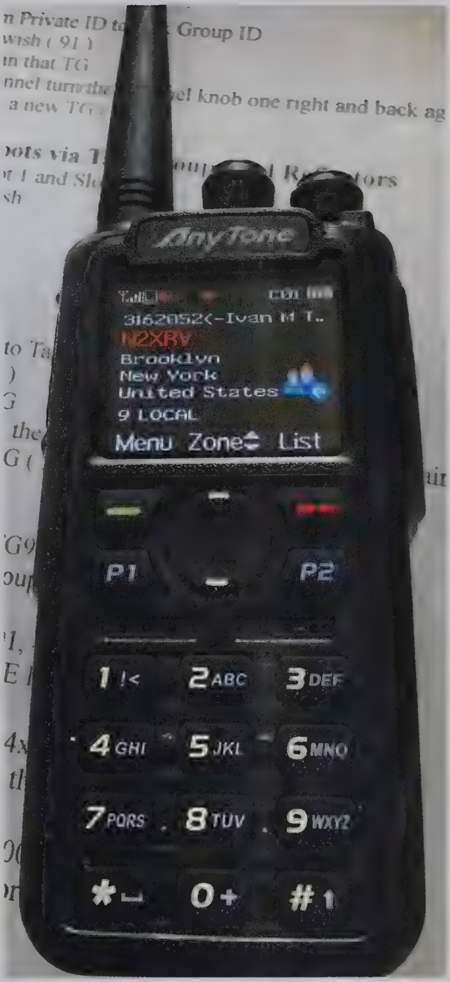
The other thing to be aware of is that there is more than one DMR network. What's a DMR network? As you might imagine, it's a group of repeaters, hotspots and end users all interconnected between themselves. They may, or may not, depending on their approach, have interconnectivity to other DMR networks.

Although DMR is by nature able to talk to all other DMR systems – this may not be the case with the users that run the networks – some of whom passionately hold certain positions, which are at odds with other groups' approaches. There are two main DMR networks in the UK, which you'll probably hear referred to as Phoenix and Brandmeister. There are some smaller networks too, such as the Salop network, the South West Cluster and the Northern DMR network.

Each user on a DMR network needs an ID number. No matter which DMR network you are using, you can use the same ID number. If you have more than one radio, you can use the same DMR ID on each radio. You can obtain your DMR ID, free of charge, at **[2]**.

If you've listened to DMR users talking, you're bound to have heard 'codeplug' mentioned. A codeplug is simply the configuration file for a radio – so it'll include your DMR radio ID, the repeaters and talkgroups that you can use, amongst many other variables. Actually, building your own codeplug for a radio isn't as bad as you might first imagine, but it's probably best to leave that until you are a bit more experienced with DMR. You don't need to do it with the AT-D878UV Plus that we're shortly going to look at, at least as it is supplied from Moonraker.

The other thing that newcomers to DMR sometimes comment on, is how it sounds. I have known Chris, G4CCC for years. We met back in the late 1980s and have worked each other on FM, SSB and indeed FT8. When we first worked on DMR, I remember we barely recognised each other's voices! It's not that DMR gives bad quality audio, but you won't get the rich tonal quality that you might experience on a fully quieting FM signal. It's something you quickly get used to.



The AT-D878UV Plus reviewed here was loaned by Moonraker.

Getting started with the Anytone

The Anytone DMR transceivers, both the AT-D878UV Plus and its little brother, the AT-D868UV, come well packaged and presented. Both radios are dual band, 144 and 432MHz and will work on both DMR and regular FM.

Unpacking the radio, it comes with an antenna (SMA female), 3100mAh battery, drop in charger, AC adapter, belt clip, USB programming lead, wrist strap and instruction manual. Because the AT-D878UV Plus is also fitted with a Bluetooth module, additionally, it comes with a Bluetooth PTT button, Velcro strap and USB charging cable (all to be used with the Bluetooth PTT button).

The instruction manual states that the power levels on VHF are 7/5/2.5/1W whilst on UHF, they are 6/5/2.5/1W. I found the power levels were a little lower than stated, but was quite happy with that, being cautious of running higher power close to my face or head, particularly at UHF.

The AT-D878UV Plus comes from Moonraker already configured for you with a codeplug installed. The aim is that you can switch the radio on, your DMR ID will already be installed in the radio (you'll have to say what it is when you buy the radio, of course) and it will be set up for all the DMR repeaters in the UK (as well as the analogue repeaters, complete with CTCSS tones).

Getting started

Where I live is on the fringes of handheld DMR coverage for both 2m and 70cm repeaters, so my first test of the AT-D878UV Plus was to use my digital hotspot, which you can think of as a very low power, local repeater. I did have to quickly install the Anytone Customer Programming Software (CPS) for the AT-D878UV Plus on my laptop, connect to the radio using the USB programming lead and amend the frequency of the channels that had been configured on the AT-D878UV Plus for hotspot access, but you may or may not need to do this. The Anytone CPS will only run on Windows machines, although I get around that on my MacBook by running a Windows virtual machine, although there are some other approaches such as containerisation if you are so minded.

Having amended the frequency of the hotspot channels in the codeplug and uploaded it back to the rig, I realised I could have done it from the front panel, without needing to go near the computer! Simply go into Menu/Settings/Chan Set and within that menu, change the Tx Freq and Rx Freq to the frequency of your hotspot and you're ready to go.

Very quickly now the radio burst into life on the Brandmeister Wales Chat talkgroup TG23570 and it was Peter, GW4VRO in Pembroke Dock operating through the new GB7DP repeater at Treffgarne in Pembrokeshire. I work Peter quite frequently on a variety of modes, so it was useful to be able to confirm that the AT-D878UV Plus sounded OK.

The AT-D878UV Plus has a few features built in that may not readily be apparent. For example, there's the Digital Monitor. This is really handy if you don't know what talkgroups are being carried on a repeater. You can switch the Digital Monitor on (Menu/Digi Moni) and then choose whether you want to monitor both time slots and various other parameters. Depending on what you select, you can then see all traffic on a repeater and see which talkgroups are in use. This is also handy for determining which 'Colo(u)r Code' is being used on a repeater. You can think of Colour Code as the digital equivalent of CTCSS on an analogue radio, it establishes access into a repeater or hotspot. I should add that in most cases, with the codeplug supplied with the AT-D878UV Plus, you probably won't need to do this, as the repeaters you are likely to use should already be in the codeplug. As you get more advanced in your use, though, it's a good feature to have.

Even more handy, is the ability to enter ad-hoc talkgroups. In other words, if you discover a repeater is carrying a talkgroup that hasn't been programmed into your codeplug. You long press the 0 key and then press # to change from Private ID to Talk Group ID. You can then type the number of the talkgroup you want to move to and hit the PTT. You'll now be on that talkgroup. Note that before you try this, you'll need to check that the Group Call Hold Time in the Digital Function section of the Programming Software is set to 30 minutes. I've suggested that the Moonraker codeplug is changed to include that setting as a default, as it's really powerful to be able to change talkgroups on the fly.

A built in GPS

The AT-D878UV Plus also has a GPS included. Switch it on and it will lock to the satellites. It took a while when I was inside the house, and in fact, I read that if you are handy with a hex editor, you can make a configuration change that will speed up the lock – have a look at [3]. You can switch the GPS on or off using Menu/GPS/GPS On-Off and there's an icon on the screen of the rig that goes from blue to red when the GPS has found your position. Under Menu/GPS/GPS Info you can see all the data you'd expect, like latitude, longitude, altitude, speed, date and time. In a perfect world, wouldn't it be nice if it also displayed a Maidenhead locator square? Unfortunately it doesn't.

You can use the GPS Info and save it to an outbox in case you want to send the information to another DMR user as an SMS type message. DMR supports text messaging between handsets, but don't get too excited – not all handsets will talk to each other and some networks are not set up to pass messages! But if you and your friend have similar radios, you should be able to send each other messages.

Digital and analogue APRS

The GPS information can also be used by the AT-D878UV Plus for APRS applications. You can configure the AT-D878UV Plus to send the digital version of APRS, DPRS. Note that not all DMR networks will pass DPRS information (Brandmeister does), allowing your position to be reported onto the APRS website [4]. The AT-D878UV Plus also has a limited implementation of analogue APRS. It's able to transmit APRS packets but not receive them. You can set the APRS type to either digital or analogue. I first tried analogue and you'll need to edit the frequency as it defaults to 145.000MHz – you'll need to change that to 144.800MHz. You can configure the transmission to be made at the beginning or end of your transmissions – end is probably preferable to avoid a delay to each transmission starting. You can change packet path, beacon message as well as the power. However, when I tried monitoring the APRS transmission on my Yaesu FT-2DE, although it *sounded* like a packet transmission, it didn't decode, which was the same on a Kenwood TH-D72E. I tried varying the frequency, in case something wasn't quite right. A bit of research and I discovered that there is a bug in the firmware so that if the Digi Path is left at the default WIDE1-1, WIDE2-1 the packet transmission cannot be decoded. Remove the comma and WIDE2-1 from the end and you'll find it works perfectly!

The AT-D878UV Plus is fitted with a Bluetooth module and comes with the Bluetooth PTT shown here.

Digital recorder

The AT-D878UV Plus has a record feature that you can switch on. This records the transmissions that it receives as well as your outbound transmissions. This only works when the rig is in digital mode; you cannot record FM transmissions. It also only records traffic on the channel/talkgroup the rig is on. That might sound obvious, but if you have Digital Monitor running, although you can hear traffic on other talkgroups, these will not be recorded.

Bluetooth connectivity

Unlike any other DMR portable I can think of, the AT-D878UV Plus features Bluetooth as standard. It comes with a Bluetooth Push to Talk (PTT) button. In addition, the AT-D878UV Plus can pair with many in-car hands free systems, so that you can attach the PTT with the supplied Velcro strap to a convenient spot, perhaps on the gear stick and have true hands free operation with the rig using the microphone from your handsfree kit and with the audio from the rig coming through your car audio system. It's nice to see this level of functionality built into a radio rather than having to add an expensive option into an already expensive radio, which has been the case with all other Bluetooth options from other manufacturers up to now. This is a real major benefit of the radio and the nice thing about it is that it just works. There are obviously other possibilities – use a Bluetooth headset when you are out walking and have the PTT strapped to your hand, with the rig in a pocket or a rucksack. With the APRS beacon enabled, this might make a nice hiking setup.

Roaming

The AT-D878UV Plus also supports Roaming, where the rig will check across several repeaters that are carrying the same talkgroup to see which is the best signal, then switch to that channel. As supplied, the Moonraker codeplug didn't have any roaming configured and unfortunately where I live, there is little opportunity to try and configure it as a test.

Conclusion

I enjoyed using the AT-878 Plus. It's probably one of the most flexible DMR handhelds I've used and one of the least quirky. It behaves as you would hope it would and 'just works'. Believe me, this is not a given! Also, unlike many other DMR handhelds, the instruction manual is clear and well written. The Bluetooth option really sets it apart and the ability to support roaming may be of interest to you. The ability to send analogue and digital APRS is a feature that you may enjoy on top of standard DMR and FM operation.

Although this review is about the AT-D878UV Plus, it's worth noting that nearly everything I've said also applies to the slightly cheaper AT-D868UV. The AT-D868UV does *not* have Bluetooth, Roaming or analogue APRS built in, but if you do not need these features, it is a rig that you may want to look at. There is also the AT-D878UV available with roaming and APRS, but without Bluetooth.

My grateful thanks to Chris Taylor of Moonraker UK Ltd (www.moonraker.eu) for the loan of the AT-D878UV Plus and his help and willingness to answer my questions. The AT-D878UV Plus costs £199.99 and is available configured as described from Moonraker UK Ltd. The AT-D878UV, without Bluetooth costs £169.99 and the AT-D868UV costs £129.95.

Websearch

[1] www.dmrfordummies.com/talkgroups
[2] https://register.ham-digital.org
[3] http://members.optuszoo.com.au/jason.reilly1/868mods.htm
[4] https://aprs.fi

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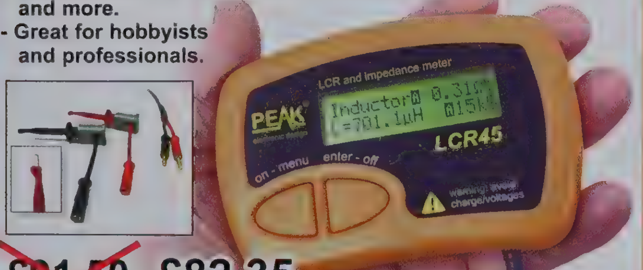

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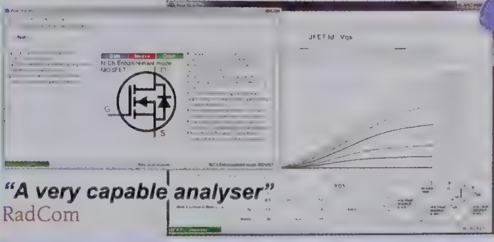

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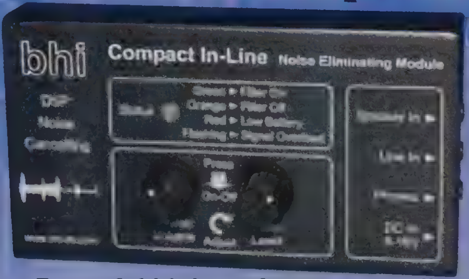

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The Whizz Whip

Moonraker answers the portable operator's dream

I dream of an all-mode hand-held radio that covers Top Band to 23cm and uses just a simple, integral antenna. Whilst the electronic side is now possible, any such aerial remains a pipe-dream – but Moonraker's new Whizz Whip is the next best thing. Amazingly, it covers 80m to 70cm in one compact unit, with just a single control to adjust the matching. But is it any good?

When I received the review sample I quickly assembled it by plugging the BNC-ended long whip into the corresponding socket on the main unit, then plugged that into the antenna socket on my radio. The very first time I plugged in the whip the BNC was very tight but subsequently it was fine. Having long since parted company with my FT-817 I used my TS-2000, set to 5W, simply because it was handy. Venturing out with a 12V battery to a piece of reasonably open countryside, I set up in seconds and was soon roaming around the bands.

The Whizz Whip is certainly very easy to tune. The comfortably large knob makes it straightforward to adjust; simply listening for maximum noise on receive is all you need to do in order to get a reasonable match. I did cheat a little and use my radio's built-in ATU to finesse the tuning but it never had to work hard. The specs say the Whizz Whip gives 2:1 or better SWR over its range and I saw nothing to make me challenge that.

Is it as good as a cumbersome wire aerial strung up between trees? No, of course not. But it's also a long way from just being a "dummy load on a stick" (as some all-band aerials have been colourfully described). There is no doubt that the Whizz Whip will get you on the air quicker than almost anything else and, because it requires no faffing about with radials and so on, it's just as quick to pack up again. Best of all, the 1.3m telescopic rod reduces to just over 200mm so you can travel with it – and the matching unit – in your pocket!

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Design Notes

GNSS Vulnerabilities

A recent report on the BBC News [1] concerned possible jamming, or disruption, of the Global National Satellite System (GNSS) positioning signals at an international airport. Whether the allegations in that report are true or not, there is no doubt that intentional and unintentional disruption to GNSS signals frequently occurs.

Ever since GPS location and tracking started to become mainstream, small jammer devices have been available from mail order and even high street vendors. Their use has been descried in adverts for such reasons as to "... stop your employer tracking you [in a company vehicle fitted with a tracker...]". But I'll leave it to your imagination to think of other, more dubious, reasons.

The original GPS was very easy to jam. In the early days with first and second generation receivers it could happen easily and unintentionally. A weak signal, or broadband noise from a transmitter on an adjacent frequency falling at 1575MHz would do the trick. The emergence of third generation receivers around the year 2006, those that digitised a wide spectrum and looked at a long portion of the data from every visible satellite simultaneously stored in deep memory, helped. The vulnerabilities were lowered and the receivers could work indoors and in partly shielded areas. But they were still quite vulnerable.

Latterly, other GNSS systems are coming into use. The Russian GLONASS system was always there, although always a poor cousin to GPS and on much the same frequency, several manufacturers of GNSS modules did use it to augment GPS. Now we have the Beidou and Galileo constellations coming on board.

As before, they make use of the same 1.575GHz frequency, but now augmented by other frequency bands around 1.2 and 1.3GHz. This use of alternate frequencies (something that was always in place on GPS, but only available to government and approved users) means enhanced accuracy. RF propagation anomalies due to the ionosphere can be mostly removed, leading to the typical 10 metre (often much better) accuracy we can now expect.

Multiple frequency bands and constellations also means increased security and resistance to jamming. The trouble is, jamming techniques have become a lot cleverer, simpler, and cheaper.

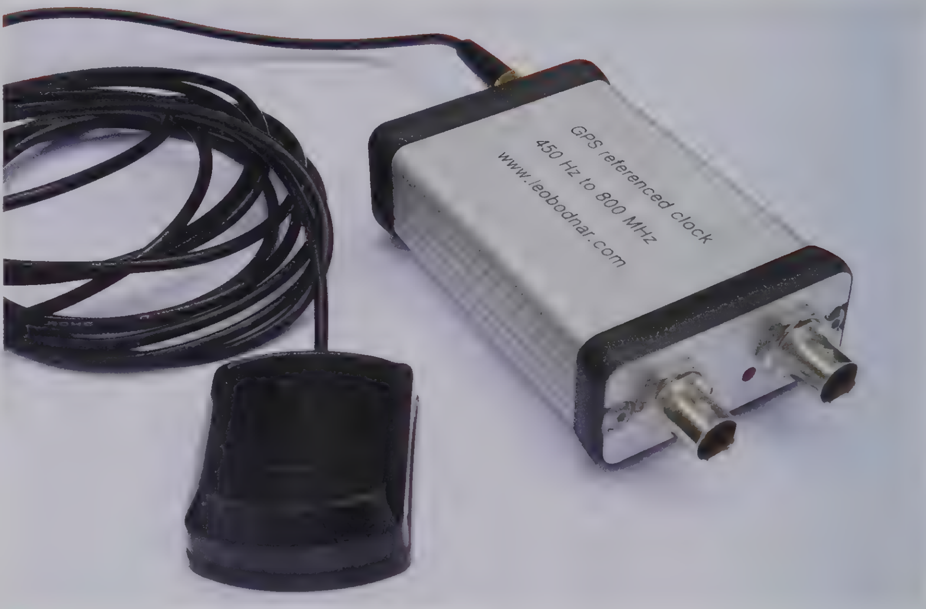

PHOTO 1: The Leo Bodnar GPS Disciplined Frequency source. This one can generate two, separate, highly accurate reference signals.

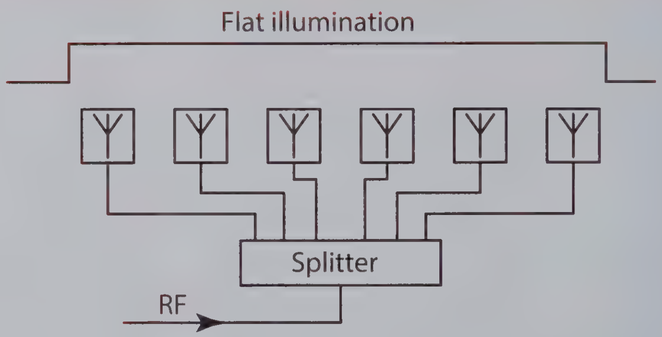

FIGURE 1: A linear array of radiators, fed with uniform signals is akin to a rectangular pulse.

Spoofing

Nowadays, just transmitting a jamming signal such as a carrier or broadband noise is not enough. Modern GNSS modules can 'look though' many such waveforms. And even if the wanted signal is blocked, the better units can recognise a jammer signal and warn the user it is present, rather than just giving out false information. So unless a jammer is really strong and covers the wider frequency set, disruption from simple high-street or mail-order low cost units is less effective; although it can still work.

What has emerged more recently is spoofing. Instead of trying to just block the reception of GNSS signals, the jammer transmits a set of waveforms that looks like real signals from the satellites, but carrying the wrong data. So now any GNSS receiver will think it's getting a proper signal and will calculate a fix – which just happens to be wrong. It may be wrong by a few metres, or the other side of the world! It's really up to the spoofing operator to choose what they want to do. This is believed to be case in the BBC News report. A spokesman stated "... an emerging subset of EW activity: the ability to mimic, or 'spoof', legitimate GNSS signals in order to manipulate positioning, navigational, and timing (PNT) data...". "*GNSS attacks are emerging as a viable, disruptive strategic threat*" (original emphasis).

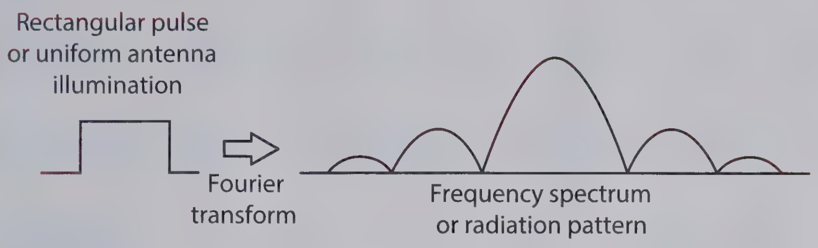

FIGURE 2: The SINE(X) / X, or SINC(X) pattern corresponding to the spectrum of a pulse waveform, or sidelobes of a uniformly fed antenna.

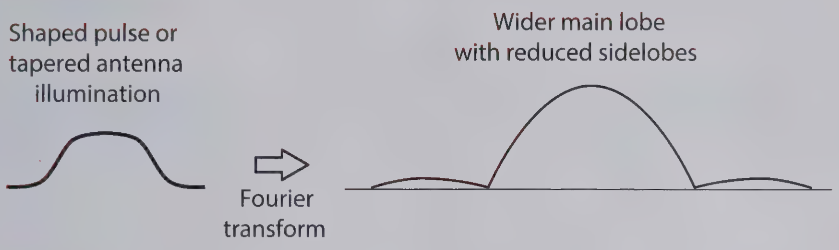

FIGURE 3: When the edges are smoothed, or the illumination profile is tapered, the sidelobes reduce.

While the spoofing of GNSS signals may sound a very complex and advanced task, the hardware needed is not actually that complex. Perhaps eight DDS chips – one for each apparently visible satellite – capable of generating at 1.5GHz (even low cost ones will do that now, via alias products). To allow these to be programmed fast enough to simulate GNSS they need to be controlled by a Field Programmable Gate Array (FPGA, the modern equivalent of an awful lot of fast CMOS chips). And after that, it's 'only software' to program the FPGA to control the DDS chips. In hardware terms, nothing very much more complicated than a modern direct sampling SDR. Back in 2006 when the third generation GNSS modules were emerging, such GPS simulators existed, but there were only a very few in the world, usually used behind carefully locked doors with security guards outside. Now, any organisation can buy or even make one.

Implications

So what are the implications for us, radio amateurs? No one can doubt that the use of GPS locked (or more correctly 'disciplined') frequency sources is now widespread within our community.

There was a time, 20 years ago, when anyone operating on the microwave bands would have to tune across several tens of kHz of band to find a weak signal, often while trying to align a narrow beamwidth dish. Now nearly everyone uses locked local oscillators and frequency is known to within a few tens or perhaps a couple of hundred hertz – even on the 24GHz and higher microwave bands. At the other end of the spectrum, at LF and VLF, coherent signalling techniques in ultra-narrow micro-Hz bandwidths require very high stability and frequency accuracy. In both cases GPS disciplined oscillators (GPSDO) are nearly always in use. One such unit, very popular now, is the one made by Leo Bodnar **[2]** that can be programmed to generate a reference accurate to better than one part per billion. **Photo 1** shows one such unit.

Most microwave and many VHF and UHF beacons nowadays incorporate GNSS locking. Many also use it to generate timing information for data modes or cyclic operation. So any jamming will upset our frequency accuracy and upset beacons. We often use the lower end, low cost modules for such applications and they are more susceptible to jamming – even accidental disruption such as from the phase noise from that 1.3GHz beacon with its antenna right next to the GPS one. Or that low cost Wi-Fi link on 2.4GHz.

If you're monitoring the marine AIS (Automated Identification System) to see if there's a 2m DX opening, as mentioned in last month's RSGB Matters, there would be implications. AIS is critically depended on GNSS for its positioning information so, while monitoring AIS reports for propagation alerts, if you see something patently absurd like an oil tanker casually sailing through Birmingham, you can reasonably assume that some sort of spoofing is underway!

Fourier and antennas

The Fast Fourier Transform, or FFT, is set to make an appearance in the syllabus of the amateur radio licence exams. The only knowledge needed for the exam is that it provides the method to convert time domain, or sampled signals, into the frequency spectrum and as such is used for spectrum and panoramic displays and waterfall plots. But the Fourier Transform (FT) (of which the FFT is just a very efficient implementation, optimised for computer calculations) is not just for time-frequency. In fact, M Fourier first developed it while looking at heat flow in steam engines in the 18th century.

An area where the FT can come into its own, although rarely met in amateur radio circles, is in antenna design and measurement. The radiation pattern of an antenna is related to the field illumination of its aperture. We all know that a larger antenna has a narrower beamwidth, and a small antenna has a wide beamwidth. Does that sound familiar? In spectrum analysis, a long duration sinusoid, or a wide pulse, has a lower frequency that a shorter duration cycle or a short pulse. Could there be a connection?

There is: the Fourier Transform of the field illumination across the aperture of an antenna is its far field radiation pattern. The situation is complicated a bit by the fact that antennas have a two dimensional shape and radiation pattern and rarely have uniform illumination due to boundaries with conducting surfaces. Time-frequency appears to only be in one dimension, but for a basic visualisation we can consider azimuth and elevation antenna pattern each as a separate case.

Take the example of a linear array of radiators fed with equal powers for uniform illumination, as in **Figure 1**. The size of the array's aperture determines the beamwidth, and hence the gain. The uniform illumination across the array, in signal terms, could be said to be equivalent to an electrical pulse of a certain width. A rectangular pulse has a SINE(X) / X or SINC(X) frequency response, as in **Figure 2**, with wide spectral components – keyclicks. A wider pulse or slowed edge results in a lower bandwidth than a short narrow impulse, **Figure 3**. The extreme is an infinitely short pulse with a flat spectrum from DC to blue light.

Andy Talbot, G4JNT
andy.g4jnt@gmail.com

The same is true of our antenna; for a uniform field distribution across the aperture, the lobes of the SINC(X) response are our antenna's sidelobes. If we smooth the edges of our pulse, or shape the waveform, the far out frequencies are lowered but the total energy in the pulse is reduced. The same is true of our antenna; if we taper the illumination across the aperture the sidelobes (= keyclicks) are reduced but at the expense of a slightly wider beamwidth (= energy in the signal). Exactly the same situation applies to a parabolic dish antenna. We control illumination across the dish by careful design of the pattern of the feedhorn to minimise sidelobes. The infinitely short pulse is equivalent to an isotropic radiator with omnidirectional radiation pattern.

With phased array antennas it is easier to visualise the illumination pattern. Multiple small radiating elements are each fed with their own version of the transmitted signal, with phase and amplitude control applied to each element. So now we have complete control of the field illumination across the aperture (the whole phased array) by varying amplitude and phase to each element – so we can theoretically adjust them to give any radiation pattern we want, subject to limitations based on the total size of the array.

Yagis and long antennas

Horns and dish antennas are easy to visualise this way, but what about long antennas that beam in the direction of the long dimension? All that happens here is that the field illumination has a phase taper applied. If each equally spaced element has a constant phase offset to its previous one, the angle of the beam is squinted. A phase shift equal to the physical spacing gives radiation in the direction of the axis instead of broadside. By looking at the field illumination as a complex value with amplitude and phase, the Fourier Transform will reveal the true radiation pattern.

A Yagi antenna is an array of dipoles with the phase in each element controlled by its length, spacing and coupling to each adjacent one. The reflector is 180° out from the first director, for example. With so many variables, you can see why the design and building of Yagis is such a complex area, and only modern computer analysis allows designers to work backwards and properly optimise based on calculated patterns.

A helix antenna can be considered to be a set of loops, all driven with a continually diminishing input signal. The spacing of the turns determines the phasing, and means the beam is in the forward direction, and sidelobes aren't too bad.

Antenna measurement

The real area where the Fourier Transform comes into its own with antennas is in the measurement of radiation patterns. Instead of a large outdoor range with the antenna placed on a positioner or turntable and the radiation pattern measured conventionally, the antenna is fixed in a large anechoic chamber and radiates a test signal. Then a small test antenna – such as a dipole, patch or active electrically small probe – is moved across and all round the antenna under test. At regularly spaced intervals the phase and amplitude of the signal is recorded; a network analyser is used for this task. The complete set of measurements may well be many tens of thousands, even millions, of individual phase/amplitude values, each with an associated location around the antenna under test. When completed, the radiation pattern is calculated from these values via a Fourier Transform in two dimensions.

Such a technique is called Near Field antenna measurement and, although it needs an accurate two dimensional positioner for the test probe, is often easier and cheaper than using a large antenna test range, which may have to be outdoors with weather protection. To be in the true far field of large high gain antenna can need a huge test range. Near field measurements don't have this requirement.

My first job after starting full time employment in 1980 was with a breadboard phased array antenna for 1.6GHz whose design was eventually for use on a satellite generating adaptable spot beams. It had an overall diameter of 1.8 metres. I had the task of getting this integrated and measured on two antenna ranges. One, a conventional far field range with a test distance of 100 metres located on an old airfield near Chelmsford. The second was a Cylindrical Near Field Test (CNFT) range that was itself under evaluation. The work was twofold – to test the phased array antenna with both spot beam and wide beam patterns being generated, and to evaluate the then very new CNFT facility. The results from each set of measurements were remarkably close and went some considerable way to proving the CNFT technique in the eyes of its potential customers.

Websearch

[1] www.bbc.co.uk/news/technology-48786085

[2] www.leobodnar.com/shop/index.php?main_page=product_info&products_id=234

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[1] www.rsgb.org/radcompix

[2] https://tinyurl.com/RC-guidance

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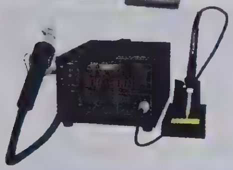

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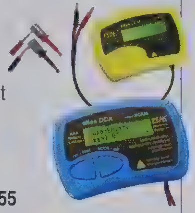

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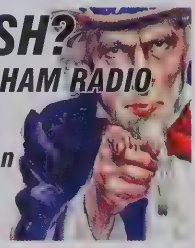

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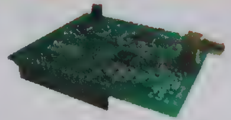

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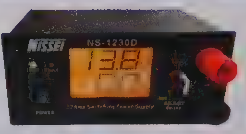

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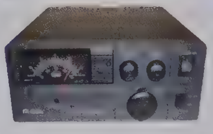

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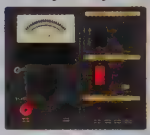

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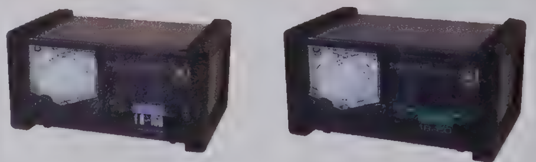

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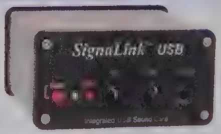

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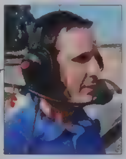

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PTT-FS-RCA Foot switch with 7ft cable with phono plug **£50.95**

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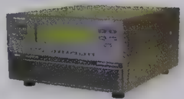

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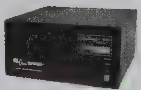

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2kW Fully Automatic HF+6m Amplifier. Compact and powerful without the worry of solid state PA's. **£4949.95**

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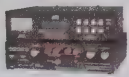
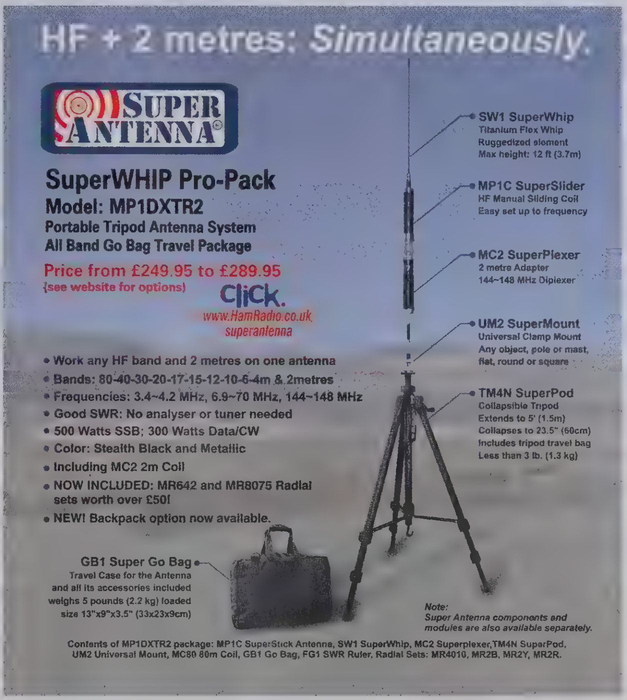
MFJ-259C	Antenna Analyser 530kHz-230MHz	**£319.95**
MFJ-269C	530KHz-230MHz, 415-470MHz Analyser	**£399.95**





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SuperWHIP Pro-Pack
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Portable Tripod Antenna System
All Band Go Bag Travel Package

Price from £249.95 to £289.95
(see website for options)

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- Work any HF band and 2 metres on one antenna
- Bands: 80-40-30-20-17-15-12-10-6-4m & 2metres
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- Good SWR: No analyser or tuner needed
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- Including MC2 2m Coil
- NOW INCLUDED: MR642 and MR8075 Radial sets worth over £50!
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Titanium Flex Whip
Ruggedized element
Max height: 12 ft (3.7m)

MP1C SuperSlider
HF Manual Sliding Coil
Easy set up to frequency

MC2 SuperPlexer
2 metre Adapter
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UM2 SuperMount
Universal Clamp Mount
Any object, pole or mast, flat, round or square

TM4N SuperPod
Collapsible Tripod
Extends to 5' (1.5m)
Collapses to 23.5" (60cm)
Includes tripod travel bag
Less than 3 lb. (1.3 kg)

GB1 Super Go Bag
Travel Case for the Antenna and all its accessories included weighs 5 pounds (2.2 kg) loaded size 13"x9"x3.5" (33x23x9cm)

Note: Super Antenna components and modules are also available separately.

Contents of MP1DXTR2 package: MP1C SuperStick Antenna, SW1 SuperWhip, MC2 Superplexer, TM4N SuperPod, UM2 Universal Mount, MC80 80m Coil, GB1 Go Bag, FG1 SWR Ruler, Radial Sets: MR4010, MR2B, MR2Y, MR2R.

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RF Explorer will display full frequency spectrum in the band, including carrier and modulated shape, it will display Spread Spectrum activity, if that exists, and will show bandwidth to monitor collisions, frequency deviation from expected tone, etc.

ML&S PRICE: £179.95
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A truly hand-held Spectrum Analyser with a frequency range of 50KHz-960MHz. Windows/Linux/MacOS Open Source & API Libraries.

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Pocket-sized Antenna Analyser providing fast and accurate measurement of vector impedance, VSWR, vector reflection coefficient, return loss, and R-L-C (as series or parallel equivalent circuits). Typical applications include checking and tuning antennas, impedance matching, component test, cable fault location, measuring coaxial cable losses, and cutting coaxial cables to precise electrical lengths.

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PRH-145A	as above, 500W throughput	£235.95
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mRS MiniVNA Antenna Analysers

Perfect for checking antennas and RF circuits for hams and commercial users.

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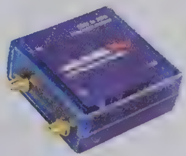

MiniVNA Pro 2 with Bluetooth	100kHz-200MHz	£379.95
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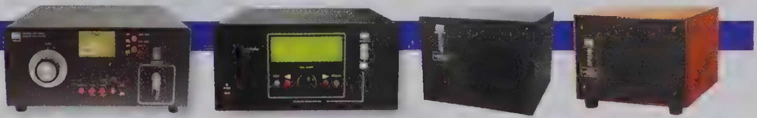
Palstar



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HF-Auto	1.5kW PEP fully automatic ATU for QRO	£1549.95
AT-500	600W PEP Antenna Tuner	£549.95
AT-2K	2000W PEP Antenna Tuner	£599.95
AT-2KD	Differential 2kW PEP Antenna Tuner	£624.95
AT-4K	2.5kW PEP Antenna Tuner	£1049.95
AT-5K	3.5kW PEP Antenna Tuner	£1149.95
BT-1500A	Balanced Antenna Tuner	£859.95
PM-2000AM	Power/SWR Meter	£249.95
PM-2000A	Base Power/SWR Meter	£189.95

PALSTAR DUMMY LOADS

DL-1500 (1.5KW) **DL-2K** (2kW) **DL-5K** (5kW) **See web for prices.**

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GAP ANTENNA PRODUCTS, INC

GAP Antennas from the USA are in stock!

- Unique Features Standard to All GAP Antennas
- Unique "Elevated" Feed
- No Tuning Required
- No Traps No Coils
- Automatic Band Switching
- No Tuner Required!
- Input Power : Legal Limit*
- Input Impedance : 52 ohms Nominal

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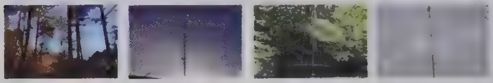

GAP Challenger DX-8 80m-2m 2kW, 31.5ft tall	£449.95
GAP Eagle-DX 40m-10m 2kW, 21ft tall	£449.95
GAP Titan-DX 80m-10m 2kW, 25ft tall	£469.95
GAP Voyager DX-4 160m-20m, 2kW, 45ft tall	£529.95

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This exciting range of Spanish manufactured antennas are new to ML&S. Covering frequencies from 80m-10m the full range is available from your favourite Ham Store.

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HUSTLER

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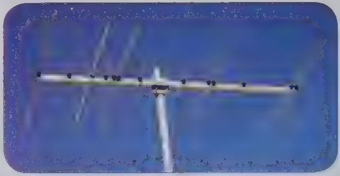
Hustler are one of America's oldest manufacturers of Ham Radio antennas. The famous "White Whips" have been seen on many cars operating HF mobile. Their HF base range of 4, 5 or 6-BTV antennas are probably the easiest to assemble and get going and of course are ground mounted, operating with just an earth spike mounted close to the base.

Base Station Range
Free standing, max 7.3m tall, 1kW

4-BTV 40/20/15/10m	£189.95
5-BTV 80/40/20/15/10m	£239.95
6-BTV 80/40/30/20/15/10m	£279.95

ML&S are sole distributors for EAntennas in the UK.

EA ANTENNA



2m & 70cm Dual Band. 4λ5- element beam	£69.95
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MyDEL

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In Two Sizes. Baby Loop & Midi Loop.

Covering the entire 80m-10m range built to ultra-professional standards.

BABY LOOP. £1349.95
6.6MHz-29.8MHz with Mk2 Controller. With RS-232 Rig Control interface.

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NEW PRODUCT

NEW! CIRO STEALTH MAGNETIC LOOP
6-6-30MHz can mount on top of a table or wall. Lightweight and easy to install.
ONLY £1099.95

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Huge selection always available

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CP-VU8	80m-70cm 200W Compact HF Base, only 2.7m Long!	£449.95
X-30	2/70, 3/5.5dB, 1.3m Long	£44.95
X-50N	2/70, 4.5/7.2dB, 1.7m Long	£64.95
X-300N	2/70, 6.5/9dB, 3.1m Long	£99.95
X-510N	2/70 Fibre glass 8.3/11.7dB gain. 5.2m long "N"	£129.95
V-2000	6/2/70, 2.15/6.2/8.4dB, 2.5m Long	£89.95
X-7000	144/430/1200MHz (2m/70cm/23cm) 8.3dBi (144MHz), 11.7dBi (430MHz), 13.7dBi (1200MHz) 5m Long	£189.95

Mobile Antennas

NR-770RSP	100W, 2/70, 3/5.5dB, .98m long, spring loaded	£36.95
MR-77	Magnet mount/antenna combination. Includes 13' RG58 coaxial cable with BNC, SMA or PL259 connector	From £25.95
SG-7500	2m/70cm, GAIN 3.5/6.0, 41" long	£65.95
SG-7700	1/2wave C-Load radialless(144MHz), 2x5/8wave radialless(430MHz), 3.5dB(144MHz),6.0dB(430MHz). 1.06m long	£64.95
SG-7900		£94.95

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MX-72N	1.6-150/400-460MHz Duplexer	£39.95
MX-62M	1.6-56/140-470MHz Duplexer	£59.95
MX-610	HF/6+2+70 (for FT-8900)	£65.95
MX-2000	6/2/70 Triplexer	£79.95
MX-3000N	2/70/23 Triplexer	£69.95

Switches

CX-210A	2-way, SO-239 Die Cast	£89.95
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CX-310A	3-way, SO-239, Die Cast	£74.95
CX-310N	3-way, N-Type, Die Cast	£109.95

Wonderwand Wonderloop Antennas

WonderWand Antennas U.K.

Designed and built in Great Britain

WonderWand Widebander 1.8-460MHz with 1.3M Whip!	£129.95
Wonder-TCS 40-10m Tuneable Counterpoise	£59.95

or buy both together for only £169.95!

WonderLoop 750
7MHz-50MHz. Superb compact qrp portable loop for direct rig mounting. **ML&S Only £109.95**

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ML&S ARE THE SOLE WORLDWIDE DISTRIBUTOR FOR ALL LDG PRODUCTS

LDG Auto Tuners are intelligent and designed from the start to work seamlessly with your radio. Press the Tune Button and the rig and the tuner will do the rest; reduces power, transmits a carrier, automatically matches the antenna to the rig, then restores the original power and mode.

LDG YT-1200 for Yaesu Transceivers
Auto-ATU for Yaesu FT-450, FT-450D, FT-950, FT-991, FT-991A, FTDX-1200 and FTDX-3000.
Only £244.95
Also available LDG YT-100 as above but for FT857, FT897 and FT-100. **Only £199.95**

LDG Z-817 Auto Tuner for the FT-817/ND
Seamless control via CAT Port of 817. Internal battery tray for portable use. 100mW-20W SSB&CW, 5W for data. **Only £129.95**

LDG IT-100 for Icom Transceivers Auto-ATU for ALL Icom 100W Transceivers. **Only £179.95**

LDG Z-100Plus Small, low cost 125W Auto ATU. Will tune from only 100mW of drive & has almost zero standby current once tuned.
Only £159.95

LDG Z11Pro11 Portable version of the Z-100 with its own internal battery tray & manual controls for fine-tuning for using outdoor portable operation. **Only £179.95**

AT-100Pro11 General Purpose tuner with Bar Graph LED readout showing power/SWR status. Will tune from only 1W and handle 125W SSB/CW. Manual tuning capability.
Only £239.95

AT-200ProII
As above with 200W RF power handling. Ideal for TS-990, FTdx5000, IC-7851 etc.
Only £269.95

AT-600ProII As above with 600W RF power handling. Perfect for legal UK limit power amplifiers. (There must be some out there).
Only £384.95

AT-1000Pro11 As 600ProII with 1kW RF power SSB or 500W data. **Only £519.95**

LDG RT/RC-100 Weatherproofed Remote Auto-Tuner with shack controller. Powered via the coax feedline & built-in frequency sensor.
Only £249.95. 60W version. **£439.95**

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LDG RBA-1:11:1 200W PEP 1.8-30MHz. Current Balun allowing ladder or end-fed wires to be used with any 100W LDG Tuner or stand-alone.
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LDG RBA-4:1
Voltage Balun version of above **Only £30.00**

Sole World Distributor of LDG *
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MyDEL **CG-3000R Antenna Tuner**

The best value remote wire antenna tuner now with remote control included. **ML&S: £269.95**

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ATV

This month we take a look at receiving Digital Amateur Television.

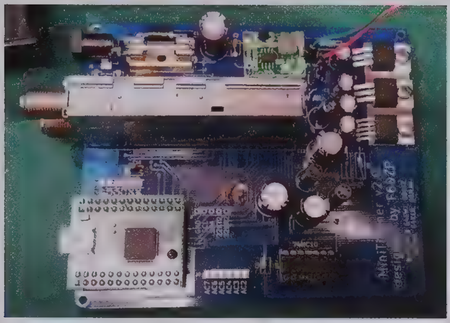
PHOTO 1: The MiniTiouner hardware.

Input LNB-B
Revision # B
Serial # 18/11/01
MiniTiouner-Express
DC Power +8 to 24V
144-2420 MHz
DVB-S/S2
Receiver/Tuner/Analyzer
USB2
"Power ON" LED
Input LNB-A
www.datv-express.com
PHOTO 3: The MiniTiouner Express.

When amateurs first started transmitting digital ATV (DATV), the only way to receive the signals was to use an ex-commercial or domestic digital satellite TV receiver. Now there are more options, each using a different mix of hardware and software.

There are essentially two problems that need to be solved to receive digital ATV: the first is to amplify and convert the DATV signal to the correct level and frequency for the chosen demodulator/decoder; the second is to demodulate, decode and display the exact format being transmitted.

PHOTO 2: DC0XH received over QO-100 using the MiniTiouner and a Raspberry Pi.

Capturing the signals

Received DATV signals will normally be at a very low level; however, most commercial satellite tuners are designed to work with about 40dB of amplification between the receive aerial and the tuner, so at least one high-gain preamp should be used. On the lower bands (71MHz, 146MHz and 437MHz) a filter (after, or in extreme cases before, the preamp) is almost essential.

Traditional digital satellite receivers have an input frequency range of 950 - 2150MHz. Clearly this only covers one amateur band – 23cm. A number of up-converter and down-converter solutions have been described in *CQ-TV*. The most popular was the modified SUP-2400 as described on the BATC Wiki **[1]**. The more recent tuner used in the MiniTiouner covers 144 – 2450MHz, so can simply be used with a preamp and filter on many bands. An up-converter for 71MHz is also described at **[2]**, and PCBs are available from the BATC Shop. On the higher bands, receive converters built for narrow-band operation work well with an IF around 146 or 437MHz.

Note that if using a standard LNB to receive DATV from QO-100, the down-converted signal will be on about 745MHz, so traditional satellite receivers will not work without an up-converter.

SDR–based receive solutions typically tune from 50-1500MHz, so there is a reduced requirement for frequency conversion, although they will normally benefit from a preamp and filter.

Demodulating and decoding DATV

Current DATV standards include both DVB-S and DVB-S2; however, these are often transmitted at a lower symbol rate than can be decoded by commercial satellite receivers, which normally have a lower limit of 1MS (1000kS). One exception is the Octagon SF8008 that can decode DVB-S2 down to 250kS.

The MiniTiouner hardware and MiniTioune software has been specifically designed to enable the use of low symbol rates and reception of signals down to 33kS has been demonstrated. The MiniTiouner is now available from a number of different sources; BATC **[3]**, the REF (French national Radio Society) **[4]** and the DATV Express team **[5]**.

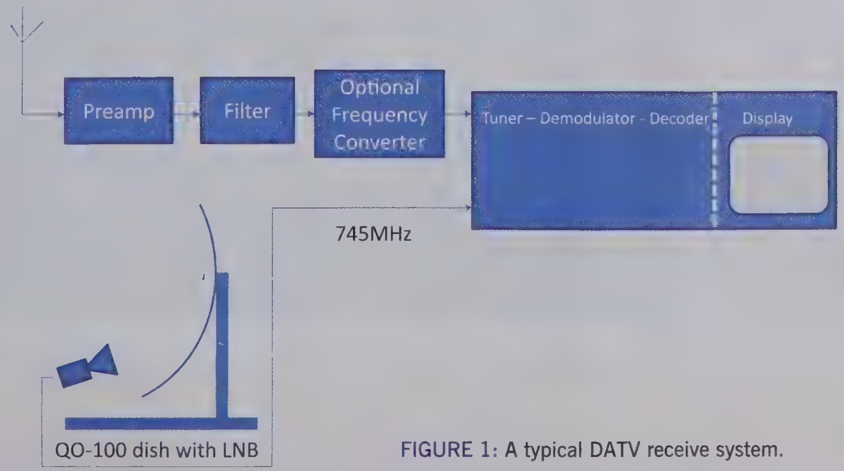

FIGURE 1: A typical DATV receive system.

However you purchase it, the MiniTiouner system is the best way to receive DATV; the Windows software is a free download, and alternative Linux software for use with the MiniTiouner and the Raspberry Pi is soon to be released and will be incorporated into the Portsdown system.

For some time, Pascal, F4DAV has been developing the Linux LeanDVB software, which can be used to receive DVB-S or DVB-S2 with an RTL-SDR. This has been incorporated into SDRAngel, giving it integration with other SDR features and a graphical user interface. The problem with LeanDVB is that it does not perform the full software error correction, so needs about 6dB more signal to resolve a signal than MiniTiouner.

Since the launch of QO-100, Marcel Kröner has been working on a DVB-S2 demodulator for Windows (DVB-S2 Demod GUI). This uses an RTL-SDR, LimeSDR or SDRPlay to receive and needs a powerful Windows 10 computer to do the error correction. Whilst this is still a work-in-progress, it shows a lot of promise and has enabled many amateurs to receive transmissions from QO-100 without MiniTiouner Hardware.

QO-100

There are lots of options for receiving DATV. Now that there ATV signals are receivable anywhere in the UK for almost all of the day from QO-100, there is no excuse for not giving it a try. Check out **[6]** to look at the activity.

Websearch

- [1] https://wiki.batc.org.uk/SUP2400_mods
- [2] https://wiki.batc.org.uk/BATC_Wiki
- [3] https://batc.org.uk/shop/
- [4] https://boutique.r-e-f.org/kits-et-composants/205-minitiounerpro-avec-nim.html
- [5] https://www.datv-express.com/
- [6] https://eshail.batc.org.uk/wb/

Dave Crump, G8GKQ
dave.g8gkq@gmail.com

RSGB 2019
Convention

RSGB 2019 Convention

When you receive this edition we will be about eight weeks away from the 2019 RSGB Convention.

Most of the talks are now confirmed and the October edition will feature the full programme – we hope that you have already booked your tickets and accommodation – go to www.rsgb.org/convention.

Lecture programme

We are delighted that Dave Sumner, K1ZZ will be giving the after dinner speech on Saturday evening and also the keynote address on Saturday morning. The morning presentation will be entitled *Our Global Amateur Radio Community*. Amateur radio has always transcended the barriers and boundaries of geography, nationality, culture and class. Dave has been involved with the IARU for half of its 94-year history, first as a member of the ARRL professional staff and currently as its volunteer Secretary. Along the way he has worked with hundreds of radio amateurs in dozens of countries to protect, promote and advance the unique access to the radio spectrum that we all enjoy. He will share why he believes a bright future awaits generations of radio amateurs to come.

Ian White, GM3SEK, returns to update his 2015 Convention talk about reducing RF noise levels and the risk of causing interference. The original talk called *Clean Up Your Shack* has had over 7,000 views on the RSGB YouTube channel. This year's talk, *Clean Up Your Shack – Revisited*, reviews the practical user experience and updates the recommended RF chokes and filters. (It will help to have viewed the 2015 talk at www.rsgb.org/video in advance)

The RSGB is showcasing Beyond Exams – a suite of initiatives designed to promote engagement and enjoyment in the hobby, by trying out more things it has to offer.

For those of you interested in the aspects of amateur radio where the 'boundaries are challenged', Chris Whitmarsh, G0FDZ will talk about *122GHz and Up*. Chris is a very well-known and respected microwaver and his talk will cover the 122, 134 and 241GHz bands and beyond, and the equipment that is typically used. He will also cover the operating challenges to enable the record breaking contacts to be made.

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In the AMSAT stream we have a very topical presentation from Pat Norris FRAeS, FRIN, AIAA, CITP who is a retired space and IT engineer. Pat spent 50 years working on space projects including the Apollo Moon landings as a NASA contractor and the Hubble Space Telescope as a European Space Agency program manager. He was awarded the Apollo Individual Achievement Award in 1969 and the Sir Arthur Clarke Lifetime Achievement Award in 2016. His latest book *Returning People to the Moon After Apollo: Will It Be Another Fifty Years?* was published in June. His talk will be entitled *Returning to the Moon 50 Years after Apollo 11*. The question of why we haven't sent humans to the Moon since 1972 is explored by identifying the success factors of Apollo and the failure factors of the contemporary programme.

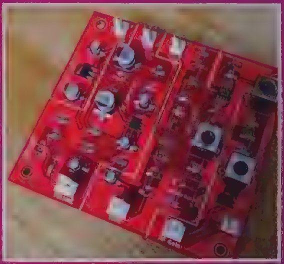
ICQ Podcast ran a successful interactive session last year and are returning this year where the topic will be *Grow, Merge or Disband your Club – Is your club relevant in today's society?* Is someone from **your** club going to attend this and participate?

The latest list of talks can be found at www.rsgb.org/convention. We are trying to include synopses of every talk in time for you to make your choices of which session to attend (but we are dependent on the speaker providing us with the relevant information!) Please remember to look at all the stream headings rather than just the ones that you normally concentrate on. A classic example is the talk in the VHF stream by Alwyn Seeds, G8DOH. His talk is entitled *Coax and connectors, the forgotten ingredient of high performance VHF/UHF stations*. His talk is equally relevant to all frequencies and Alwyn will draw on his long professional and amateur experience to explain many of the pitfalls and mistakes made when selecting feedlines and coaxial connectors.

We look forward to seeing you there!

Graham Murchie, G4FSG
convention@rsgb.org.uk

Convention Buildathon



Fancy a dinner, good company and constructing a 40m receiver all at the same time?

The Buildathon at the RSGB Convention is a little different. Presented as an alternative to the Convention's Gala Dinner taking place on Saturday 14 October, those attending not only have a pleasant hot & cold buffet, but they get an evening of surface mount construction to boot. For the same price as the Gala Dinner, the event not only includes the food itself but also the SMD Sudden 2 – Direct Conversion 40m Receiver made and supplied by Kanga Products UK, use of all the necessary equipment and a helpful team of volunteers to help you through the build. Not bad for £39.50 – and a great evening, too.

The Sudden 2 is a surface mount version of an original design by the late Rev George Dobbs, G3RJV, which appeared in *SPRAT* (Autumn 1989) and has been a popular project ever since. This SMD version of the Sudden 2 is brought to you through a collaboration between Kanga (UK) and John Clement, KC9ON of 3rd Planet Solar in the USA.

As an alternative to dinner at the Convention, why not try something a little different this year and book a place at the RSGB Convention Buildathon?

www.rsgb.org/convention

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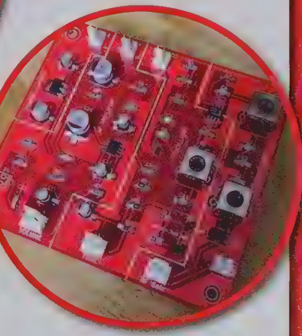
Why not join hundreds of others who have already discovered one of the best social events in amateur radio and visit the RSGB Convention 2019?

Forget the S meter!

Don't Forget Room Prices Now Include Discounted Entry To The Convention!



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- Decodes D-STAR, NXDN, dPMR and APCO P25

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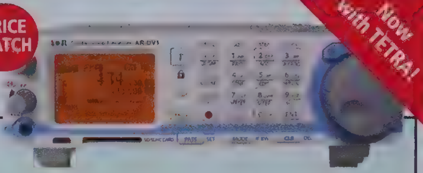
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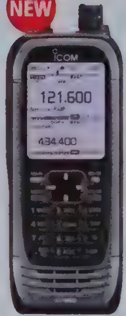
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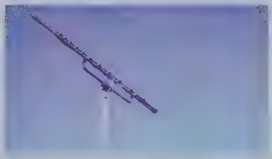

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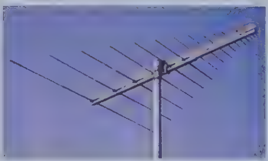

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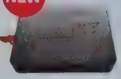
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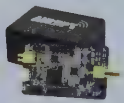

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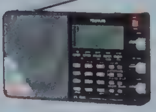

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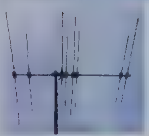

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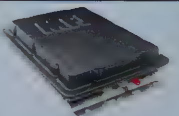

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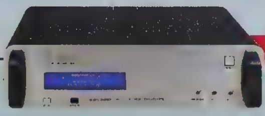

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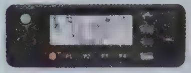

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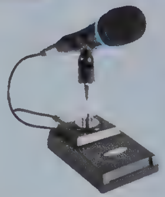

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BM-17-SINGLE-IC	For Icom Radios	£114.95
BM-17-SINGLE DYNAMIC		£107.95

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Pro-Set 7 IC	for Icom (Black or Red) colour	£259.95
Pro-Set 7	HC7 element (Black or Pink)	£239.95
Pro-Set 6		£159.95
Pro-Set 6 IC	for Icom	£169.95
Pro-Set Elite 6		£174.95
Pro-Set Elite IC	for Icom radios	£189.95
PMS-6 Pro Micro	Single headset	£85.95
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Complete with DTMF Microphone

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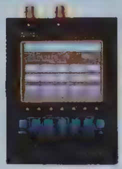

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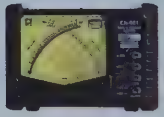

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CN-103LN	140-525MHz 20/200W N type	£89.99
CN-501H	1.8-150MHz 15/150/1.5kW	£89.99
CN-501H2	1.8-150MHz 20/200/2kW	£89.99
CN-501VN	140-525MHz 20/200W N type	£89.99
CN-901HP	1.8-200MHz 20/200/2kW	£129.95
CN-901HP3	140-525MHz 20/200/3kW N type	£169.95
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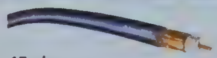

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per metre........£5.99 price per 102m drum	£629
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Westflex 103	Semi Air-spaced low loss	£159.95
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Nevada 32	3.2mm 5kW	per metre	£1.20
Nevada 32D	3.2mm 5kW	100m Drum	£99.95

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5 element
50MHz 10.5 dBi

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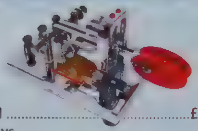
WY-140	3 el 144MHz (wide band) 10.5 dBi	£89.95

MORSE KEYS



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- Requires optional adaptor lead for your make of radio
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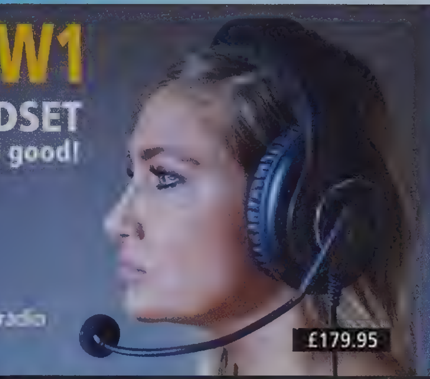

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Professional quality DMR Digital/Analogue Handheld with GPS

- GPS built in • Vox built in
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- Software & lead supplied

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DJ-MD5

Standard version as above - but no GPS £139.95

Note: These radios require programming for DMR operation

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HF Transceiver + SDR feature

- 100mW – 2W optional QRP mode
- CW Keyer + Filters built in
- Front Panel detachable – (with EDS17 cable option)
- 135kHz - 30MHz RX

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50W VHF/UHF Mobile with 'Rainbow' display

- RX 108-174, 400-479 MHz

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More Alinco

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Ideal for 100W HF Transceivers

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- 30A Deluxe Supply
- Variable voltage, low noise, extra filtering

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ACOM AMPLIFIERS

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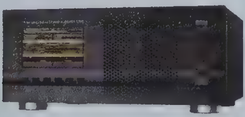
1.2kW Solid State Amplifier



- Covers 1.8-54 MHz
- RF sensing for auto band changing or CAT interface for full rig control.
- Interfaces with AT-04 Auto tuner/Antenna switch

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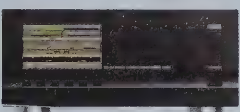
Acom 600S

600W Solid State Amplifier



- Covers 1,8-54MHz
- RF sensing for auto band changing or CAT interface for full rig control
- Interfaces with AT-04 Auto tuner/Antenna switch

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Acom 1500S

Quality amplifier using 4CX1000A tube

- Power: 1.5kW PEP
- Frequency: 1.8-54MHz
- Drive: 60-80W for full output
- Virtually Silent QSK keying

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1.5kW Auto ATU and 4 way Antenna Switch

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- Uses main coax for all control signals – no extra cables required
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- Auto Sweep Mode
- Power: 6 x AA cells (not included)

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- Vee: 7.4m
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GP-6M	144/430MHz, SO-239 Lgth 3.07m (SO239)	99.95
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GP-9M	144/430MHz SO-239 Lgth 5.15m (SO239)	149.95

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Nevada Celebrates 50 Golden Years

(Left to right) Mike Devereux, G3SED at home in the shack, the first shop in Portsmouth in 1969 and Sam Taylor-Nobbs of Icom UK demonstrating the IC-7300 to to Nevada's Glyn Dodwell, G4CFS.

It is 50 years this September since Mike Devereux, G3SED, opened an amateur radio and electronic component retail shop in the centre of Portsmouth.

Mike had been hooked on amateur radio from the age of twelve, obtaining his full callsign when just fifteen years old. Over the ensuing 56 years he has become well-known in amateur radio circles. He was awarded the RSGB ROTAB trophy for outstanding and consistent DX achievements in 2012 and, as a keen and proficient CW operator, he is also a member of the First-Class Operators Club, limited to just 500 members worldwide.

Mike's passion for amateur radio has got him involved in many projects over the years, quite apart from his involvement with Nevada Radio.

DXpeditions

In the 1990s he was part of the team that provided communications for Camel Trophy Rallies in remote parts of the world. Whilst working for Camel he and the team operated from Borneo, Central America, Belize and travelling over the Andes mountains, the Atacama Desert in Chile. In 1994 he was part of a 10-man team that put Jordan on 6m for the first time with the call JY7SIX. The team were there at the invitation of King Hussain and looked after by the Royal Jordanian ARC.

Mike was a founder member of the 5 Star DXpedition group who put on some of the world's largest DXpeditions. Nevada Radio both sponsored the operations and stored the equipment at their Portsmouth warehouse. His job was to oversee both the selection and layout of antennas and he operated on the 9M0C (Spratly Islands), 3B9C (Rodriguez Island) and D68C (Comoros) DXpeditions. He also supported the 3B7C and T30C efforts, testing antennas at his home QTH.

The music business

For Mike, the business was a natural extension of his hobby. After studying for an electronics degree, a quirk of fate found him renting a shop in Portsmouth. Initially just intended as cheap student digs, he decided to open the shop and see what happened. Initially he sold electronic components and ex government radio equipment. The business flourished and soon he had the whole range of Kenwood, Yaesu and Icom for sale.

It was the repair of sound equipment that was to present him with another business opportunity. He was asked to fix a concert sound system for a Max Bygraves concert taking place that evening. The ancient system was beyond repair so, with the help of several customers, he put together a system for the evening and then provided the sound system for the rest of the tour! He spent a 7-year period supplying and operating theatre sound equipment, working with many stars of the day.

Back in Portsmouth, the amateur radio business was quickly complimented with a fledgling side selling sound equipment, disco, lighting and musical instruments. That side of the business developed rapidly and Mike built a 16 track recording studio on the first floor above the shop. With the studio an instant success he set up Wessex Music, in a co-publishing deal with Warner Bros Music, to spot local talent early and help bands to success.

The radio business

Nevada Radio has continued to grow was one of the first companies to be involved with the new DAB digital radios, selling them to the likes of John Lewis, Dixons, Maplin and other high street retailers. Never one to stand still, in 1995 Mike had the opportunity to purchase ailing *Citizens Band Magazine*. This was quite a challenge as he had never published a magazine before and was given quite literally weeks after signing the contract with Argus Specialist Magazines to produce the first magazine. In 1996 he enlisted the help of Elaine Richards (now editor of *RadCom*) to help him grow the magazine. Between them they widened the focus, renamed it *Radio Active* and it grew year on year, until four years later it was sold to PW Publishing.

In 2016, Mike decided in was time to concentrate exclusively on the core business of amateur and hobby radio. His success is due in no small part to a loyal and dedicated staff, some of whom are now approaching 40 years with the company. The Nevada front line staff are radio enthusiasts and the company is now the longest serving amateur radio retail business in the UK. During September Nevada will also be offering selected daily deals to celebrate the anniversary.

Congratulations

The RSGB would like to congratulate Mike, G3SED and Nevada Radio on the 50th anniversary and wish him many more years within the hobby.

Nevada Radio
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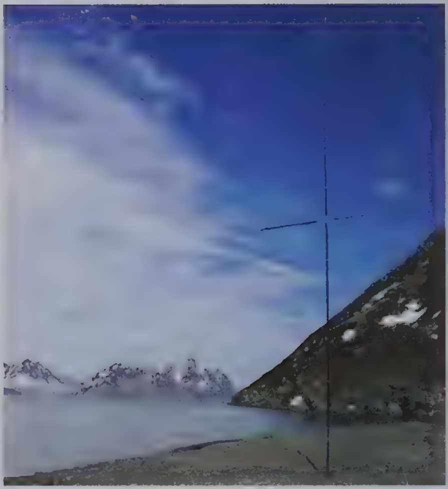
HF

The QTH of M0VFC, M1GEO and M0WUT on EU-172 in Denmark for the IOTA Contest.


The R205NEW VDA on Bogoslova Island, AS-205.

The occasional sunspot popped up in July but didn't do much to raise the solar flux index, which was less than 70 for much of the month. But, as always, there was still DX around.

Sporadic-E kept things lively on the higher bands and there were some more distant signals mixed in with the Europeans. For example, Thailand was workable on 24MHz CW around 1100UTC if you had a beam. KH7XS in Hawaii seems to make his own propagation; to call his antennas big would be an understatement. He was worked on 15m CW by Bob, MD0CCE around 0710 and heard by him shortly afterwards on 12m. GR2HQ worked KH7XS in the IARU contest on 15m at 2156UTC and there were other EU spots as early as 1850UTC. Bob, MD0CCE also worked several JAs on 10m FT8 between 0800 and 0900UTC.

September marks the annual CDXC HF Challenge to work as many DXCC entities as possible using the 15-6m bands. Last year's winning score was 137 DXCCs. This year there will be separate categories for CW/SSB and Machine Generated Modes. See www.cdxc.org for more information. DX conditions should be better in September as the ionospheric chemistry changes, but Sporadic-E will be declining.

IREF, the Island Radio Expedition Foundation, has given its Expeditioner of the Year award to three winners. The first is Cezar, VE3LYC, the second is Mike, VE7ACN and the third is Dave, EI9FBB. See www.irefradio.com for more info.

Vasily, R7AL, the leader of the R26RRC team, was not satisfied with activating one new IOTA in June so on returning from Paramushir Island (AS-204) as R26RRC he immediately set off in a yacht for another new IOTA, Bogoslova Island (AS-205) about 800 miles north of Petropavlovsk Kamchatky. His callsign there was the self-explanatory R205NEW. Signals from both locations were very strong and many UK stations got through.

Monk Apollo, SV2ASP/A, for many years the only operator in the DXCC entity of Mount Athos, passed away a few months ago but it seems his place may soon be taken by Monk Iakovos, SV2RSG/A. Monk Apollo's original reason for getting licensed was to provide emergency communications in the event of the traditional systems failing and this is still seen as a requirement by the authorities. Sadly it seems that visiting operators are not able to get a licence – but we can keep hoping.

There was a surprise operation during July from the DXCC entity of the Sovereign Military Order of Malta, 1A0C, which today is principally a single house/palace in the middle of Rome. The organisation is descended from the Knights Hospitallers who controlled the island of Malta for most of the 16th, 17th and 18th centuries.

Several IOTA trips were cancelled or postponed recently. The RQ73QQ (AS-152) team found a large number of polar bears on the island of Bolshoy Begichev and were advised to call the operation off. The 5C9A Los Farallones expedition to an unactivated Moroccan IOTA (AF-118) was postponed at the very last minute for reasons that are still unclear, just before the international team members were due to fly out. And Mike, VE7ACN had to cancel his August plans for medical reasons. On the plus side there was an unexpected activation in the IOTA Contest of the very rare AF-104 off the coast of Algeria by a team signing 7V9A.

DXpeditions

14 operators are heading to Pitcairn Island (OC-044) as VP6R on 17 October and are expected to stay for 14 days. This will be an all band, all mode operation with eight stations, monoband Yagis for the high bands and verticals + directional receive antennas for the low bands. Updates and more information can be found at https://pitcairndx.com/. Pitcairn is in the 'golden area' for propagation to the UK so they should be easy to work on 80-17m with QSOs possible on 160 and 15.

VK5GR, VK5XDX and VK5AKH will be active from Tonga (OC-049) from 23 September to 6 October as A35JT. See vk5gr-iota.net for more info. They'll be on 10-80m SSB, CW, RTTY and FT8 with occasional 160m appearances.

A large multi-national team of Mediterraneo DX Club members will be active as D68CCC from the Comoro Islands (AF-007) from 20 October to 1 November. They will operate CW, SSB, RTTY and FT8 on 160-10 metres with five stations. More information will be available on www.mdxc.org/d68ccc.

RC5A and RM0F will operate as 5H3CA and 5H3RRC respectively from Mafia Island (AF-054) from about 25 September to 5 October. They will be on CW and SSB on 1.8-28MHz.

The 11-op Italian DX Team will be QRV from Liberia as A82Z (digital) and A82X (CW/SSB)

One of the operating positions on AS-204 for Vasily on air as R26RRC.

Dan, operating as OZ/M0WUT in the IOTA Contest.

from 28 September to 11 October running five stations on FT8, RTTY, SSB and CW. They plan to post their logs in real-time, including FT8 QSOs.

A large team is planning to be active as 3G1DX off the coast of Chile from Pajaros Rocks (SA-100, a new one for IOTA) on 18-20 October, with 21-23 October as alternate dates if bad weather stops them landing sooner.

Ken, LA7GIA (6O6O in January 2018) will return to Somalia and be active as 6O7O for 14 days in September. He will operate mainly CW on 160-10m. See https://www.la7gia.com/

The ZS9V team will be active again from Robben Island (AF-064) from 1530 UTC on 15 August to 0500UTC on 20 August. See http://zs9v.org.za/ for more information.

Robert, S53R, will be active from Afghanistan as T6AA and/or T6A from the first week of September, mainly on CW. He should have reasonable antennas on LF and HF bands but local noise could be a problem. He will use LoTW but no bureau QSLs will be available.

Warwick, E51WL is back on Penrhyn Atoll (OC-082) in the North Cook Islands and has been worked in Europe on 30m FT8 around 0520UTC.

Nobu, JA0JHQ will again be active from Koror, Palau (OC-009) as T88PB during 6-9 September 2019.

TABLE 1: 2019 worked DXCC entities (correspondents and top 3 from Club Log).

Call	CW	SSB	Data	All
PY5DK	193	144	182	240
G4TUK	123	110	201	239
M0NKR	85	136	169	225
G3PXT	53	83	189	198
CT7AGZ	162		151	193
G3SVK				187
GI4DOH	153	4	77	171
G3HQT	131			138
G4XEX	72	68	104	136
M5GUS		89		89

Correspondence

(CW QSOs in blue, SSB in red, FT8 and other data modes in black italics. L= Linear, - = No Linear, S = Simple Antennas, B = Beam)

Fred, G3SVK, (LS) was active with the GB19 callsigns during the Cricket World Cup and used all of the English calls at some point to make 12,196 QSOs. He was also on occasionally with his own call and found: 17m – 1A0C; 20m – LU7HN, PZ5CO, 1A0C, PJ2Y, 5U8IU, OD5OJ, VP8LP, C31US, D44TEG, 1A0C; 30m – OJ0C, VP2V/K6TOP, 1A0C; 40m – HR9/AD8J, CE2LR, 8P5A, OJ0C, 1A0C, VK3CWB, OJ0C, 4O3A, MJ/OK1FWM, CO8WN, MJ/OK1FWM, CO8WN.

Peter, G4XEX (LS) was away for most of the month but made a few contacts from home. 17m – *JR2PMT, 5T5PA*; 20m – *E44WE, HK5WML, YB1BD*, RI1OM, 5R8UI, OA4DX, FR4QT.

TABLE 2: Forthcoming DX activity.

Until 20 August	ZS9V
Until 24 Sept	H44MS (OC-047)
17-24 August	OJ0O
24-25 August?	Shiant Is by GMs
Late Aug / early Sept	NA-210
Sept	6O7O
6-9 Sept	T88PB
15-30 Sept	3DA0AO
23 Sept – 6 Oct	A35JT by VKs
25 Sept – 5 Oct	5H3 Mafia Island
28 Sept – 11 Oct	A82 Liberia by Is
30 Sept?-11 Oct	ZK3A
1-5 October	7P8AO
7-23 October	T30GC
17-31 October	VP6R Pitcairn
18-23 Oct	3G1DX SA-100
20 Oct – 1 Nov	D68CCC
30 Oct – 15 Nov	T30GC
4-7 Nov	YJ0RRC (OC-104)
6-19 Nov	Marquesas TX7T
8-13 Nov	YJ0RRC (OC-111)
14-20 Nov	YJ0FWA (OC-035)
21 Feb-5 Mar 2020	Sth Orkneys VP8/ VP8DXU
5-12 Oct 2020	Sable Island

R26RRC team

R26RRC team on Paramushir Island, AS-204.

Peter, G3HQT (-S) reported no obvious sources of noise with background levels at S3-7 on 40m and S1-5 on 20m. He worked: 15m – PZ5CO; 20/30m – 1A0C.

Ken, CT7AGZ (-B) was busy on CW and FT8/FT4: 10m — PZ5CO, OH0C, OY1CT, 1A0C, *5T5PA, HZ1SK, TF5B*; 12m – *5T5PA, 3A2MW*; 15m – KP2M, LU0HQ, CX1AA, 8P5A, OY1CT, P40XX, *VP8LP, HZ1SK, 1A0C;* 17m – 9Y4/OK2ZI, HK7AAG, PY's, 9Q6BB, 1A0C, OY1CT, *VP8LP;* 20m – CX7CO, VP2V/K6TOP, PY's, OA4DX, P40XX, TI7W, OH0C, OY1CT, 1A0C, OJ0C, *BG7BDB, E44WE, A45XR, JH4ALY, ZD7BG, ZS1XG, ZF1EJ, LW5DR, PY5JO, TR8CA, 1A0C*; 30m – FY5KE, *V31MA, E44WE, OJ0A, 1A0C, TR8CA, ZD7MY, 4O7CC, TR8CA, A45XR, E44WE*; 40m – OH0C, 1A0C, *5T5PA*; 80m – *9G2HO*.

Gordon, G3PXT (LS) used 21 GB19 calls to make 21,000 QSOs and went on to use GB60ATG for 700+ QSOs. He netted 1A0C on 40-10m on most modes.

Finally

Thanks as always to my correspondents, to DX-World, 425 DX News and Daily DX.

Martin Atherton, G3ZAY
g3zay@btinternet.com

VHF/UHF

More exceptional conditions on the 2m band and a record 4996km contact.

MICROWAVE MO ULE
144 MHz. CO VERTE

1975 vintage Microwave Modules 2m-10m IF converter.

July 2019 pretty much continued where June left off on 6m where there were excellent openings all around Europe, Asia and over the North America. Primarily, but not exclusively, activity was at its highest at the weekends, with 6m open to East coast areas of USA and Canada.

The main focus however this month is the 2m band, where political issues have tended to overshadow things. This topic is well covered within the current news and there is up to date information available on the RSGB website **[1]**.

The 2m band has been the mainstay of upper VHF DX working over decades – I was introduced to it in 1975 when I happened onto the VHF NFD contest. In those days my state of the art system was an Eddystone 680x receiver with one of the very first Microwave Modules converters from 2m using a 10m IF. The 28-30MHz bandspread available on the likes of the Eddystone receiver was miniscule – however with very, very fine tuning and BFO (Beat Frequency Oscillator) induction, SSB stations could be copied during the contest.

Seven years later at the current QTH, I can't help remembering the magic of 2m coming right into focus. Within days of moving in, I installed a hastily-contrived scaffold pole mast and my trusty 16-element Tonna 2m antenna. Having drilled a hole in the window frame to get a usable feeder through to the back bedroom (shack), I discovered Sporadic-E in full flow with YU2CCB. Sadly, I couldn't find the microphone but a Morse key came to the rescue and the YU and others were worked.

Over the years many super QSOs have been made on the band and with the increase in technology, internet access and tropo openings that have been enjoyed over the last few years.

A major opening on 2m started early on 23 July with light flourishes of FT8 on 144.174MHz. By late afternoon, the band opened up with an excellent path from western EU to SV/LZ. The path switched almost in an instant to EA and once again to D4 (Cape Verde). DK5AI made a QSO with D41CV with a new Region 1 record distance at 4996km. During the widespread opening, EA8DBM was working across Europe in an opening lasting more than an hour. The potential here was for tropo-assisted Es or double or chordal hop Es. Last month, the Atlantic Ocean was spanned on 2m, a serious milestone that has had the whole 2m DX community wondering what could be next.

It is not hard to see the excellent tropo events of this year would be trashed by any increase in commercial companies on the band who clearly have no interests in propagation testing.

Band Reports

Paul, G3YDY (JO01) reports, "July was quite a busy month with over 500 VHF/UHF QSOs in the log across 6, 4, 2 and 70cm. Using FT8 on 6m there was plenty of Es with openings across the pond especially on 3 July. During July, 18 new squares were worked, bringing the total to 368." Paul hasn't been very active on 4m but once again FT8 provided new locator squares bringing Paul's total to 74. On 2m, for a change, Paul managed to catch an Es opening during the 2m MGM Activity Contest working IK0FTA (JN61), I8IGS (JJM78) and IW0FFK in JN61. Other operations included intense early morning tropo ducting on 26 July across the North Sea with good activity on 2m and 70cm FT8. 21 QSOs resulted, of which five were on 70cm with strong signals and ODX to SM6CEN (JO67) at +11dB using FT8. Operating as G8BGV/P from JO01HP (62m ASL) in the Backpackers/Hill Toppers Contest on 2 July, 90 QSOs were completed, with ODX being DA2T (JO41) at 603km running just 25W and a DK7ZB 6-element lightweight antenna.

Bob, G8HGN (JO01) says, "A quieter month for me this time, just 52 QSOs, due to various factors, but some nice ones in there. The shack temperature reached 37.8°C on the 25th! Highlights in the log were 6m K7BV (FM04), 9G2HO (JJ06), 9K2YM (LL48), TA5FA (KM76), RD9D (LO99) and BA4SI in PM01. 6m QSOs later in July included OD5PY (KM73), VO1SO (GN37), 4Z5MU (KM71). On 4m more DX SV2HQL (KM18) plus several Eastern European and EA/EA8 openings with the usual suspects! On 23 July continuing on 4m the excellent Sp-E opening produced QSOs with 9H1TX (JM75), CT1BYM (IM68), EA8DBM (IL18) and EA1SA (IN83) on tropo. John, G4SWX, (JO02RF) tells us that "23 July was a fun event but very few 'fish to be had' on SSB/CW despite the huge signals on FT8. 144.174MHz was full of noise and

QRM from just bad operating and badly adjusted transmitters! I saw an ON station calling an EA7 for over an hour after the EA7 had vanished. There were numerous stations who run 'beacon mode' in the first period, which often trashed some of the weaker DX stations." John's top QSOs during the event were EA8DBM (IL18), EA3EVL (JN00), EA5DOM (IM98), CT1HZE (IM57), CT1BYM (IM68), CT1HMN and CT7ABP (IM58), EA7ITL (IM66), IH9YMC (JM56), EA7FDW (IM76) and EC7ZR in IM77.

Rich, GD3YEO (IO74) reports on the 2m tropo lift he caught when he switched the rigs on early on the morning of the 25th. FT8 into JO22, 30, 31 and 32 was coming thick and fast with a pile-up of stations calling. Eleven stations worked, mostly Germany, but it had all gone by 1000UTC. "I've been mostly watching out for Es on 4m and FT8 is where the activity is at the moment working LY3A on SSB on 70.243 in their small allocation on the 22nd. I also caught the odd station that pops up when the graphs least predict, but there have been good paths into KO, KP, JO, JN, and a couple into JM (EA6VQ of Dxmaps fame). I'm still trying to catch EA8 this year but not found much propagation in that direction. Hopefully there's a little life in the Es season yet, but so far not a patch on 2014 - 2017 season."

Ian, G6TGO (IO83) describes a familiar situation that many operators have come across during the rise of the CE marked electro smog-generating consumer garbage products that are freely available. This has had a happy ending – albeit with some setbacks along the way. "I have been away from my beloved 6m/4m bands thanks to a neighbour's media equipment that was installed in September 2017. I had S9 of QRM noise throughout the band 24/7and could not null it out, therefore I could not operate. On 4m the noise was S5 24/7, enough only to work local stations Then, in January this year, it had ceased due to a media equipment change by the neighbour. This totally eradicated the QRM. So with the demise of the QRM I purchased an IC-7300. I re-coaxed the 4x4 6/4m LFA. From May onwards the Es season was workable. I was not fully operational until the 13th, with my first QSO on 14 May hearing SN9J and working AM70UR/6. The month was mainly used for getting to know the IC-7300 and setting it up, listening rather than chasing contacts. The start of June brought a new source of QRM to the North East direction, this was quickly identified, thanks to my Alinco handheld all mode Rx as an electric Go Kart battery charger. It didn't cause me too much trouble and I could null it out but I thought worth a mention here. A transatlantic opening working VO1FOG (GN37) on SSB at 3585km was on 1 July. There was an EU opening on the 2nd and 7th but nothing significant worked or heard and openings very sparse. 4m activity netted QSOs with YO6DNW working G8RBW, plus DJ5MN (JN58) and HA9MDP (JN87) lost near to completion. 4m beacon monitoring is a major pastime too and the following were heard during July: SR9RMF/B (KN09), SR9FHK/B, 9A0BFH/B (JN85), HG7BVC/B (JN97), HG8BVC/B(KN06) and HG1BVC/B in JN87." Ian hopes to hope to be operating aurora when the Sun and bands permit and also during or a day after meteor activity. The main plus point is the reduction in noise level which has re enthused the desire to work DX and weak signal modes.

Following on from Nic, G3YEG's last email about the 6m Magic Band and his simple half wave in the loft space, He estimates that it cost less than a £5 (8m of RG213U, a PL259 and some string to hold it up) and took under half an hour to construct. It managed to hear a couple of stations in Puerto Rico at -11dB and -13dB on 18 June. Then, during the evening of 6 July, running just 25W, his RF made its way across the pond to VO1FOG at -11dB and VO1HP at -14dB. The 2m opening on 2 July produced some enormous signals using FT8 from southern Italy, loudest worked was IK6DTB (JN72) +8dB. He worked 9A2AY and IK7LMX with a very variable signal from Brindisi (JN80) using his 11-element Tonna beaming east in the loft at about 4m AGL.

Having missed out on all the Sporadic-E on 2m save IK8EVE (JN71) on 1 June, Jon Stow, G4MCU says, "it was good to be treated to some decent tropo later in the month. Starting on the evening of 27 June, on 2m, I worked across the North Sea with 25W, amongst others, all on SSB, DF0WD (JO42) and DJ6AG in JO51, On 28 June, in the evening, on 2m: SK7MW (JO65), SM7XWX (JO65), OZ6TY (JO55), OZ1BEF (JO46), DL3TW, (JO44) and DL2RZ (JO54). Early morning propagation on 29 June produced massive signals from DK3EE (JO41) and SM7YES (JO67). I did try my luck on 70cm with my 1W on 28 June and worked SM6CEN (JO67), OZ9FW (JO65) so, a little bit of fun finding and working a little way away. I seem to have some advantage with sea paths, being near to the Thames and Crouch estuaries, and reaching mainly stations near the coast in Scandinavia."

Gordon, G3PXT (JO02) has been missing from 6m during the Cricket World Cup as he has been very busy operating GB19SL on HF, which has been a runaway success. Now back on 6m, Gordon is also operating GB60ATG as well has his own call and is certainly back in the swing. GB60ATG will be active from several parts of the UK during a year of operation. The country of operation at any time will be shown on the schedule page of the BARTG website. Each band/mode slot from a new GB60ATG country counts again for points [2]. Using GB60ATG on 6m, 150 QSOs were in the log during the last full week of the month and 34 DXCC entities worked. Gordon also comments on shack temperature during the heat wave – just 100W used as it was way too hot to run the amplifier at 400W.

Once again FT8 was the main mode used with the following highlights OH0JV, C31CT, R6KA, TF3JB, 4O6AH, W3LPL and also 4U1ITU in Geneva, which Gordon hadn't worked under his own call so he switched calls immediately to complete! Once again Ukraine stations were very active working KN59, KN77, KN49, KN29, KO40, KO50 and KO60 locator squares.

UKSMG Summer Marathon

As usual there seemed to be a mad scramble before 4 August, which was the closing date for QSOs in this year's marathon. Thankfully conditions maintained throughout most of the month – however in the latter week of July they had started to tail off. Then, for the reason 6m is called the Magic Band, it opened for what could be final flourish into the weekend of 28/29 July.

Sign off

Judging by comments and correspondence there is a growing disquiet about some of the 'unintended consequences' of operating FT8 on VHF. Propagation on VHF, particularly on 2m, is totally different from HF and although the mode has great potential it needs to be used in an educated fashion to realise the best results. In previous columns I have mentioned the 'endless CQers'. Often this can be in the wrong period; sadly many are oblivious to what periods mean and how they can really disturb working DX on 2m.

Another issue tagged on to this is the continuous calling after a DX station has been heard. 2m Sporadic-E conditions can change within minutes – so continuous calling to a station for an hour after the original copy is only going to cause issues with other local stations who may be following how propagation is unfolding.

Many thanks to all the contributors this month and let's hope there is more DX to report throughout August.

Websearch

[1] https://rsgb.org/main/blog/news/

Richard Staples, G4HGI
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GHz Bands

This month's column is very much about GHz bands activity. As I write this early in July, the summer portable and contest season is well underway.

The 27th to 29th June brought some welcome tropo to the GHz bands, with DX worked from 23cm to 10GHz. After many attempts on aircraft scatter in the past, I finally worked DK1PZ (JO41TH 656km) on 1.3GHz CW to give me JO41 for square #148 on the band; along with SM6VTZ (JO58UJ 994km) on CW and SM6PGP (JO67BK 952km) via SSB at 59 both ways. On 10GHz I missed out on the big signals from OZ due to my neighbour's ash tree, now in full leaf, completely blocking me to the NE. I did manage a 59 SSB QSO with F6DKW (JN18CS 414km) but we failed on 24GHz. This really highlights the difference between these two bands.

John, G3XDY (JO02OB) from his east coast location worked some nice DX over the period on all the bands up to 10GHz. Highlights on 1.3GHz were some good QSOs down to Spain (a DXCC that still eludes me on 1.3GHz!) John worked EA2TZ, (IN83), EA2EGM, EA2AWD, as well as F2CT (IN93). On 2.3GHz he worked F6CIS (IN94), on 3.4GHz OZ9PP (JO47), 5.7GHz OZ9PP (JO47) and on 10GHz, OZ9PP (JO47), OZ1LPR (JO44) and LA4YGA (JO48).

On the 27th, Neil, G4DBN reported loud 10GHz signals into IO93 from ON0EME, PE9GHZ, PI7ALK. ODX was DB0GHZ (JO34, 576km) and DB0VC (JO54IF, 763km).

1.3GHz, an impressive band?

After operating the 50MHz station at G3PYE/P next to the 1.3GHz station, Martin, G3ZAY tweeted, "Impressive band. 500km easy on 23cm. Almost impossible on 6m without Es". That's praise indeed from the Camb Hams HF CW guru, but he's right, so here's hoping we can hang on to it.

G3PYE/P set up for 1.3GHz in VHF NFD with my TS-2000X and 500W Labetech SSPA [1] plus a G4DDK VLNA23 [2] with a G4ZTR filter in front [3]. The filtered preamp dealt completely with known local cell site issues and the SSPA ran without a hitch, putting about 250W into the 55-ele Tonna Yagi at 12m AGL. During the contest, G3PYE/P worked over 70 stations on 1.3GHz, with many random replies to CQs and no aircraft scatter skeds.

It's good to see Graham, G3SHC, over at Sea Palling (JO02TS) getting going on 1.3GHz. His QTH, on the north east Norfolk coast, just 180m from the sea is a GHz band DXer's dream, with a sea take off from northwest round through north to southeast. I worked him in VHF NFD from G3PYE/P for his first QSO on the band. During the June Tropo, while he was still receive only, he had a taste of what's to come, hearing DX beacons including LA1UHG, LA3SHF, PI7ALK, PI7QHN, OZ5SHF and SK6MHI. He's trying to drum up some local activity on 1.3GHz, so hopefully we should see more from up there soon.

PHOTO 1: G4BRK and G8CUL operating G3PIA/P during VHF NFD. Courtesy G8NVI.

VHF NFD

I've had a number of other reports on 1.3GHz in VHF NFD and all reported a general increase in activity. Can we call this 'the IC-9700 effect?'

G3PIA/P (**Photo 1**) operated by Ann, G8NVI, Neil, G4BRK and Mike, G8CUL reported a "100% increase in their claimed score" with ODX being DJ5AR (JN49, 694km).

G3XDY's highlights on 1.3GHz were EI9E/P (IO62), DR5T (JN47), OK2A (JO60), OZ1ALS (JO44), DM5D (JO61), OZ9PZ (JO46) and DK0NA (JO50).

John ran his new W6PQL PRF13750 1.3GHz SSPA [4] for the first time and it performed flawlessly. The output device seemed quite rugged, having survived a spectacular flashover on the output coax connection, probably caused by contamination with copper swarf.

Jules, G0NZO reported from the Flight Refuelling ARS site up on the ridge by the Cern Giant. The main FRARS station was running only 70 and 50MHz, but Jules took along a simple 23cm station, just to 'give away a few points'. He used a masthead mounted SG labs transverter at 8m AGL, taped to the mast and feeding a 38-ele Yagi fixed to the top with cable ties! The whole station ran from LiPo batteries and rotating the antenna was by hand. He worked 12 stations in a few hours of operating. ODX being EI9E/P at 354km.

Millimetre wave report

G8CUB visited Hampshire for the annual 24GHz and Up contest in June and worked G8ACE on 122, 134 and 241GHz to local Winchester sites and out to 17km. These were all proven paths and the longest path recently tested showed enough margin on 122GHz with humidity 40% to make a longer path possible, perhaps to the Chute Causeway (34km). However, the humidity was extremely high, around 70%, signals were well down on expectations and they managed only one way on 122GHz. The atmospheric losses alone were around 27dB for 17km distance at the humidity encountered and that quickly uses up any signal margin. Oxygen attenuates these higher frequencies rapidly.

G8ACE then moved to Cheesefoot Head near Winchester and G8CUB to the Chute Causeway NW of Andover where they completed on 24, 47 and 76GHz. I believe this is the first time that two way QSOs on six bands have been made in this contest.

The mm bands are alive and well in Australia, with Andrew, VK3CV and Noel, VK3NH setting another Australian national distance record for 122GHz at 59.6km. Signals were 52 with QSB using narrowband FM. Both used identical equipment made by VK3CV – 0.5mW Silicon Radar TRX_120 module-based transceivers [5] using 600mm offset dishes. At around the time of the contact, temperature was 14°C, dew point 1°C, barometric pressure 1033mB.

Finally

Some good news. It seems that Denmark may still be hanging on to the 3.4GHz band for the near future [6].

Thanks to this month's contributors and if you have anything to add to the GHz discussion, email me or Tweet @g4bao and @ukghz using the hashtag #GHz_bands.

Websearch

[1] www.labetech.se/en/products.php
[2] www.g4ddk.com/VLNASept2013.pdf
[3] https://bit.ly/2J7Opt7
[4] https://bit.ly/2JKKEMX
[5] https://vushf.dk/breaking-oz-beholder-9cm/
[6] https://bit.ly/2NX3jui

John C Worsnop
PhD CEng MIET, G4BAO
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By Alan Betts, G0HIQ

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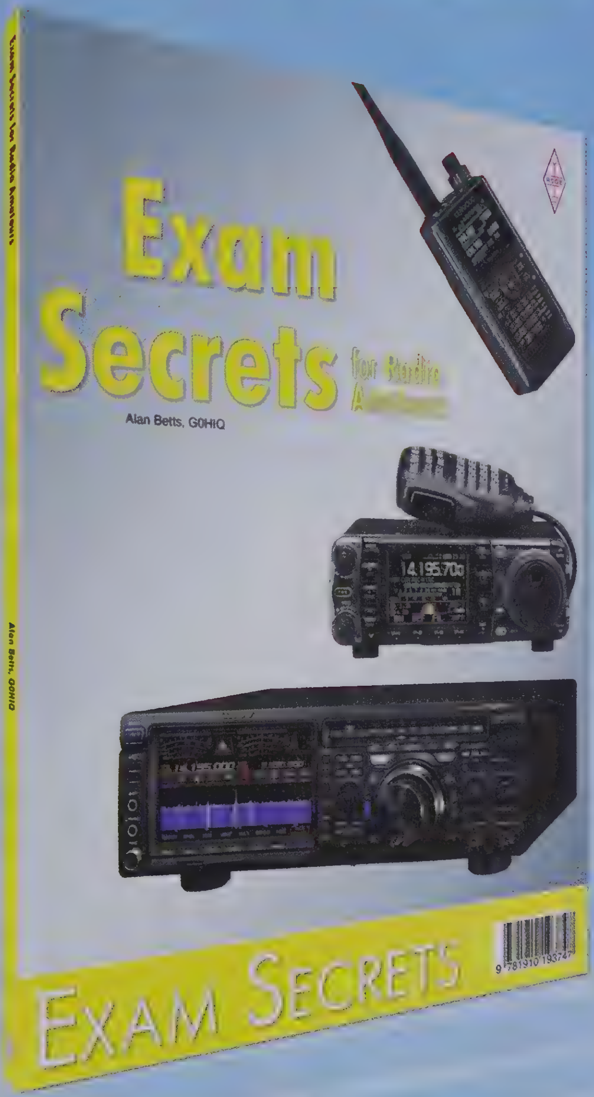
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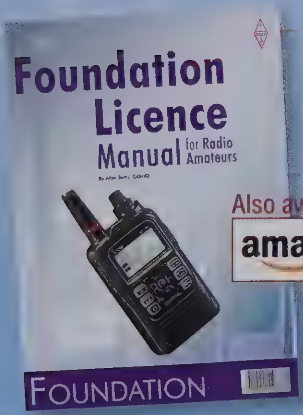
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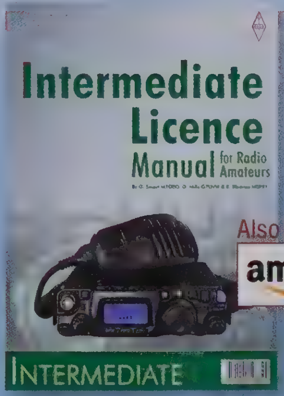
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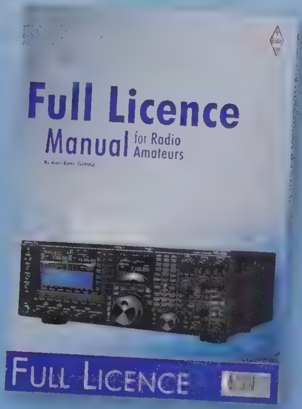
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National Hamfest

27-28 September 2019

The National Hamfest is the premier rally in the UK, with virtually all traders and amateur radio interests represented.

Entry tickets

This year's National Hamfest takes place on Friday 27 and Saturday 28 September at the Newark & Nottingham Showground, NG24 2NY.

Advanced express entry tickets are now on sale, with free postage until 1 September, via the website at www.nationalhamfest.org.uk. Purchasing express entry tickets will avoid the long queues at the gates and will see you onsite with time to look around the flea market before the main hall opens for trading. Discounted multiple tickets (in multiples of 10) are available for club or group purchases. Day tickets priced at £5 (cash only) will also be available on the day.

Camping onsite

New for this year, camping bookings are now handled by the National Hamfest organisers. Bookings can only be made via the National Hamfest website, www.nationalhamfest.org.uk, where full details are available. All camping bookings must be made in advance as no bookings can be made on the day. Please pay special attention to the times and procedures documented on the website.

Free raffle

Don't forget that your entry ticket also entitles you to a free entry in the National Hamfest Raffle. The lucky winners will have their names drawn from a hat on both Friday and Saturday. To be in with a chance to win an assortment of prizes all you need do is drop in your completed ticket stub into the box by the main door.

Main trading hall

This is the 11th National Hamfest and every year the hall is packed with everything you need to set up and maintain an amateur radio station. Whether your interest is CW, SSB, datamodes, QRP or QRO, you will find it at the National Hamfest. Many of the UK Special Interest Groups will be in attendance, including RAFARS, VMARS, BRARS, RAIBC, Leicester ARS, CDXC and others. Places for clubs and Special Interest Groups are still available and request for a stand may still be made via the website contact form.

The RSGB will host the largest bookstall of the year. This is the only event where you can meet and ask questions of many of the RSGB Committees.

As usual, the hall will host most of the leading traders from the UK, with representatives from Europe and beyond offering some great show offers. The leading manufacturers of equipment will also be exhibiting the latest equipment to further tempt you.

The winners of the National Club of the Year competition will be announced at the show. The competition, kindly sponsored by Waters & Stanton, announced the Regional winners at the RSGB AGM in April and three clubs have been put forward for the National title.

Outside attractions

Outside will be the usual flea market trading area, which is always popular. Pre-booking for the outside flea market is advisable and may be booked via the website shop.

Camb Hams will be operating the event's special event station again this year. This is an extremely important part of the show, enabling many to gain further information about the hobby from the knowledgeable and welcoming members of the group. Courtesy of Yaesu and Icom, they will be demonstrating the FTDX101 and IC-9700. Find them at their usual spot opposite the entrance to the George Stephenson Hall.

The Bring & Buy marquee will be available for those who want to sell and still look around the show, operated as usual by RAF Waddington ARC.

The social side

Many visitors visit the show for the social side of the hobby; it's always nice to sit and swap memories or catch up with friends. Onsite catering and drinks are available both inside and outside the main hall.

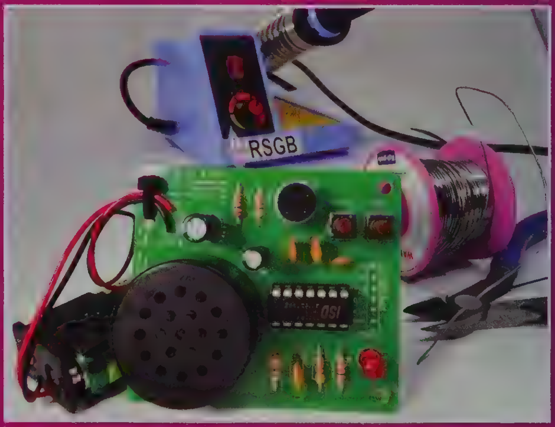
See you on 27 and 28 September at the National Hamfest, Newark & Nottingham Showground, Lincoln Rd, Coddington, Newark NG24 2NY.

www.nationalhamfest.org.uk/

Hamfest Buildathon

Proudly sponsored by the National Hamfest, the RSGB Buildathon held at the show is specially designed for the less experienced constructor. Costing the same as a National Hamfest day ticket and including admission to the show, you get to construct a nifty gadget to take home and, if you complete it on the day, you also walk away with a £5 voucher to spend at the RSGB bookstall. Win-win-win!

This year visitors will be able to build a Kitronik Record and Playback kit. This module allows a short (10 second) message to be recorded and played back. There is one button to play and another to re-record messages over and over again. The board includes a status LED that indicates that recording is in progress or that playback has completed. There are 20 components including the speaker and microphone, PCB and battery holder (batteries are included). All the equipment is on hand to construct the kit and volunteers to help you through the build. Once the challenge of building the kit is over you should still have plenty of time left over to see the show. So why not book a place for a young or less experienced visitor to come and have a go?



Places are limited but you can choose to attend either Friday or Saturday. So book your place today for only £5.

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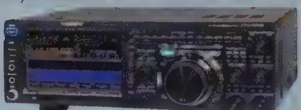

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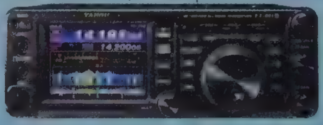

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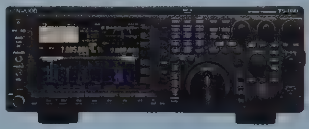

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XX9D – Macau 2019

– we did it again!

Why revisit Macau so soon after the last DXpedition there in 2017?

Demand for this location is still quite high, it's number 88 in Europe and number 36 in North America's most-wanted list.

On this trip we planned to focus more on North America, in particular on SBB. Additionally, we wanted to provide the new FT8 digital mode, which was not really available at the time of our last Macau DXexpedition.

Getting to Macau was quite comfortable with Air China via Beijing. Customs procedures and licensing formalities were easy going with the help of the friendly staff of the Macau authorities. Thanks Bom, XX9LT.

Under the leadership of Rolf, DL7VEE, we were able to build a team of 15 experienced DXpeditioners: DJ6TF, DJ7TO, DJ9HX, DJ9KH, DL1KWK, DL1RTL, DL2RNS, DL4SVA, DL4WK, DL6KVA, DL7JOM, DL7VEE, DL9GFB, OZ1IKY and XX9LT.

Antenna work: Uwe, DJ9HX and Werner, DJ9KH with the 40m vertical antenna.

Equipment

As previously announced, we wanted to intensify our activities on the low bands, because we were asked to do so and, of course, as a reaction on the forecasted bad propagation conditions on the higher bands. So, we built separate antennas for 160, 80 and 40m (verticals on 15 to 18m masts). On 30m we had a loop antenna. On the high bands we were happy enough to use the brand-new 2-element wire beam from LZ Antennas in Bulgaria together with a LBS-Pentaplexer. This beam antenna was specially modified for us as a very solid and light-weight expedition version.

This configuration of antennas offered us the chance to operate all low bands the same time or all high bands the same time. Filtering was, most of the time, good enough to do so.

As in 2017, all antennas had to be erected on a surface 30m long and 1m wide, which really is a challenge – we managed it. The reports from all over the world showed us that they performed very well.

We were using five stations with almost identical configurations: laptop with UCX software, Microkeyer, K3, filter cascades, amplifier (an Expert 1.3k, KPA500) and an antenna.

Noise issues

The team had ambitious plans for this DXpedition, we were however surprised by the extreme interference on short wave, regularly reaching levels above S9 on the low bands. The hotel had up-scaled significantly since 2017. We think some inexpensive switch mode power supplies installed for the lighting to accompany the Chinese New Year were to blame or, perhaps, some powerline QRM. We never managed to localise the source of the interference. It was particularly noticeable at night – on 30m it was significantly beyond S9, which abated promptly at 7am. The conditions on the higher bands were also worse than expected. Apart from a high noise level, we often encountered very deep QSB. Only rarely did we manage SSB, and with CW the calls had to be assembled bit by bit, like a puzzle, from the signals in the noise. RTTY was also ineffective.

In the end, the new, slightly contentious but increasingly popular FT8 digital mode saved the day, because this almost always managed to yield results. This accounts for the high proportion of FT8 QSOs in the log – almost 50%.

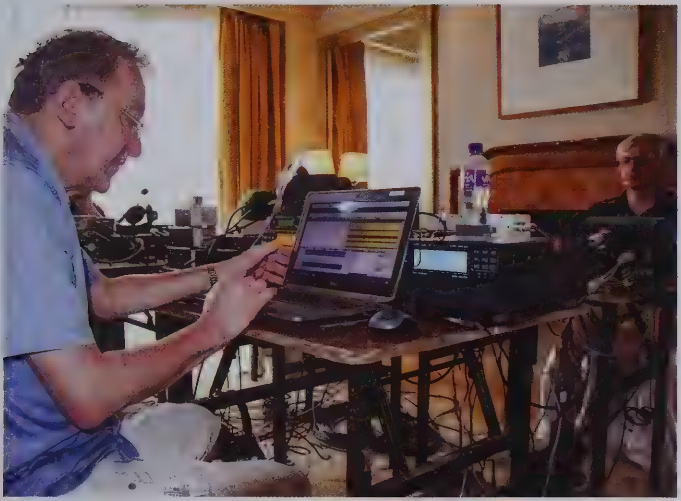
By the way, being the only CW operator between four FT8 operators in the same shack is a very special situation. Picture this: you are puzzling callsigns together with a relatively low QSO rate, fighting with QRM and QRN whilst your comrades are enjoying their FT8 QSOs in a very relaxed position, sometimes on two bands simultaneously. Nevertheless, I felt a little bit heroic!

Operating

The hotel gave us a fast and stable access to the internet, so updating our homepage and transferring the Club Log data was no problem. We also had a stable AC power supply in our room, even with the power consumption of five high power stations.

We remained on air around the clock with five stations in order to provide as many QSOs as possible. Sometimes, especially at night, it was frustrating not to be able to put more than 10 QSOs per hour into the log.

It should be noted that having five stations in a single room creates its own issues. In particular, the Expert amplifiers don't react



Unfamiliar FT-8 activities for a 'CW freak' like Franz, DL9GFB.

It looks like chaos, but it was all under control.

kindly to stray RF – despite optimal choking ranges these repeatedly ended up in 'protection mode'. A special separation would have been beneficial, possibly even allowing more than one mode on the same band. The deployment of a special low band receiving antenna would also have been desirable for this location, but unfortunately this could not be implemented due to the specific setup in and around the hotel. A remote receiving antenna for the low bands would be my preferred solution. Any ideas?

Given the circumstances, the achieved 36,000 QSOs, 8.7% of which with North America, is quite a satisfactory result. When not on shift, the operators and their accompanying wives had ample opportunity to get to know Macau with its eclectic, at once historic, futuristic and glamorous setting. A particular highlight was a trip across the brand-new bridge connecting Macau to Hong Kong, with its 55km span, the longest in the world. Hong Kong was fascinating and the cable-car trips to the Big Bhudda and Hongkong peak unforgettable.

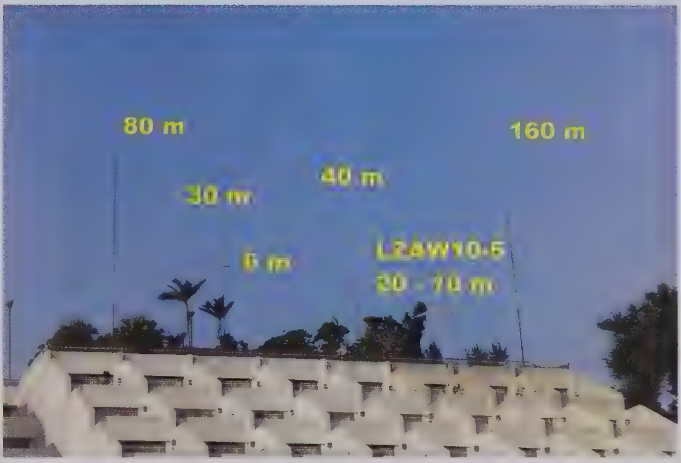
Summary

We put Macau on the air again. Given the circumstances described, the team is quite happy with the achieved 36,000 QSOs. As a team, we harmonised well, enabling us to overcome the frustration at the adverse conditions. The comradeship during ops and in our spare time was exemplary. Looking back I believe it was a good experience for all.

Heartfelt gratitude goes out to all the sponsors, the foundations as well as individuals. Thanks also to Martin Beet for his assistance as well as the staff and management of the Grand Coloane Resort for their outstanding service and cooperation. For further information have a look at xx9d.mydx.de.

Table 1: The band/mode breakdown for the XX9D DXpedition.

Band	CW	FT8	SSB	RTTY	Total	Total %
160	875	184	0	0	1059	2.9%
80	2504	2198	209	16	4927	13.6%
40	3725	3166	491	145	7527	20.8%
30	930	2772	0	0	3702	10.2%
20	2540	2705	772	215	6232	17.2%
17	3451	2750	515	59	6775	18.7%
15	1813	1859	536	150	4358	12.0%
12	593	518	33	77	1221	3.4%
10	21	363	0	0	384	1.1%
6	1	9	0	0	10	0.0%
Totals	16,453	16,524	2556	662	36,195	



The DXpedition antennas lined up on top of the hotel.

The XX9D-team, operators and XYLs (two were excused for shopping).

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the bureau.

MACAU 2019
XX9D

Werner Hasemann, DJ9KH
Whasemann@gmx.de

The latest Amate

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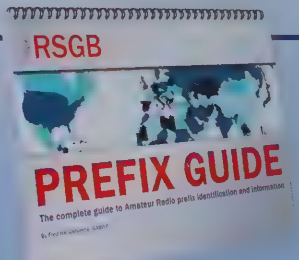
by Fred Handscombe, G4BWP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Contesting

September is a busy month for contests, plus there's a new series to tell you about, so let's get on with it.

RSGB HF

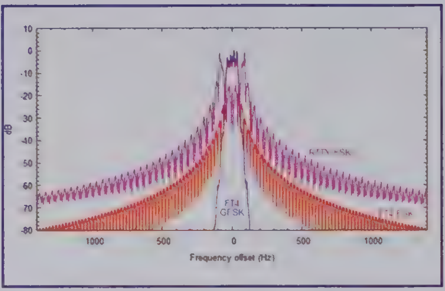
First, the new one. A Pioneer series of FT4 contests is being trialled at fairly short notice. The first takes place on Monday 2nd. See further on for more information. SSB Field Day runs for 24 hours over the weekend of 7-8th. Depending on which Portable section is entered, the maximum permitted output power is 5W or 100W. Portable stations need to register to qualify for an award, as station inspections are possible. As of 2017 this event also includes a Fixed section. The new Autumn Series starts this month and runs for three months on 80m. The first session is CW on Monday 9th, followed by SSB on Wednesday 18th and datamodes on Thursday 26th.

RSGB VHF/UHF

On VHF, September starts with a lot of 144MHz contesting. On Tuesday 3rd the 144MHz FMAC and MGMAC are followed by the UKAC. Moving on to the weekend of 7-8th, the 144MHz Trophy Contest runs for 24 hours. There are also 6-hour sections for those who want to take things a little easier. The last in this year's series of 144MHz Backpacker contests overlaps the final three hours of the Trophy contest, then continues for a final hour on its own. The 432MHz FMAC and UKAC are on Tuesday 10th and the 50MHz MGMAC and UKAC are on Thursday 12th. The new 70MHz AFS Contest takes place on the morning of Sunday 15th. The rules of the new contest are very similar to the contest it replaces, with no multipliers. After that it's back to the Activity Contests, with the 1.3GHz UKAC on Tuesday 17th, the 70MHz UKAC on Thursday 19th and the SHF UKAC on Tuesday 24th.

Best of the rest

The UKEICC DX SSB Contest, which started on 31 August finishes at 1200UTC on Sunday 1st. The new series of 80m contests run by the UKEICC starts this month, the first being SSB on Wednesday 4th. The CWops CW Open contest takes place on Saturday 7th. There are three separate 4-hour sessions. The All Asian DX contest runs for the entire 48 hours of the weekend 7th-8th. Remember that stations taking part in this contest will want your age as part of the exchange, not a serial number. The IARU Region 1 Field Day and 144MHz contests coincide with RSGB events on 7-8th, but due to UK data protection regulations entrants now have to submit their own entries to IARU contests. The Worked All Britain 2m QRO contest takes place on Sunday 8th. The SSB session of the Worked All Europe contest is on the 14-15th. The IRTS (Irish) 70cm and 2m Counties Contests take place on Sunday 15th, followed by the BARTG Sprint 75 on HF. The *Practical Wireless* 70MHz contest is on Sunday 22nd, followed by a CW session of the UKEICC 80m series on Wednesday 25th. The CQWW DX RTTY contest runs for 48 hours over the weekend of 28-29th and there's a UK Microwave Group contest on 5.7-10GHz on Sunday 29th.



Spectra of an FT4 signal transmitted with GFSK (blue), FT4 with FSK (red), and RTTY with continuous-phase FSK (purple).

JT mode contesting

Because of the enormous interest in JT (Joe Taylor) digital modes, the HF Contest Committee has decided to run a short series of FT4 contests. They will take place in the evenings on 3.5MHz, from September to November. It is being labelled as a pioneer series, because the word pioneer implies that something new is being tried. The Committee will be monitoring activity levels and the comments of entrants. If they are successful, expect more such contests; if not, expect the opposite.

FT4 is the latest machine generated mode for contesting, developed by Joe Taylor, K1JT and his team. I think it would be fair to say that its forerunner, FT8, has turned amateur radio activity on its head. Not only have lots of people started to use datamodes for the first time, but they've discovered FT8's weak signal performance to be so good that they can use it to work DX that is well below the level at which it is possible to hear the station being worked. This is especially useful at the point in the sunspot cycle we are at right now, because frequency bands that appear to be closed might sometimes be usable.

FT8 wasn't designed for contest type QSOs, so some months ago Joe developed FT4, which is an adaptation of it. One advantage of FT4 over FT8 is that it is quicker to make a QSO, but one of the payoffs is that it occupies more bandwidth. That said, FT4 still only needs about 90Hz, which is a lot less bandwidth than RTTY. This item isn't going to be a tutorial on how to configure or use FT4, but there will be detailed instructions on the HFCC website with details for downloading software before the date of the first contest. In the meantime I will mention some things about the mode.

FT4 uses fixed-length transmissions and structured messages with formats optimised for minimal QSOs. On receive, FT4 is detectable by the software below the threshold at which you can hear a signal.

Everyone can operate on the same dial frequency. Essentially, one audio bandwidth (set to wide SSB) is enough for everyone. The software analyses all the signals within the audio passband, so essentially split frequency working is the norm.

Strong forward error correction is built in, so false decodes are rare and you don't get any partial decodes.

Like RTTY, FT4 employs frequency shift keying. RTTY uses two audio tones (usually spaced 170Hz apart), but FT4 uses four audio tones (spaced approximately 23.4Hz apart). The transitions between tones are smoothed (see **Figure 1**), which helps minimise the overall bandwidth of the signal.

By analysing what CQ messages are being received, the software can recommend a best potential QSO partner for you.

FT4 is immune to intermodulation distortion.

With FT4 being suitable for weak signal working, I don't think those who enter the 10 watt section of this series will be greatly disadvantaged over those who run 100 watts. The series will have a distance element to the scoring, which is unusual for RSGB HF contests.

Steve White, G3ZVW
steve.g3zvw@gmail.com

Super League 2019-20

The new Super League season starts this month, one month earlier than last year, and after last seasons' results all the competing clubs know there's just one team to beat. The scope of the Super League series was expanded by one contest in the 2016-17 season and, as I wrote further back in this column, it is being further expanded this season, with the inclusion of a 4m contest.

Last season, Trowbridge Amateur Radio Club got off to a good start and beat Camb Hams in 6m AFS by just six points in 3,500. Some way back came three teams that were spaced quite far apart in terms of points. Bristol Contest Group were third, Grimsby ARS fourth and Hereford ARS fifth.

The Camb Hams A-team won 160m AFS comfortably, with Bristol CG in second place. Grimsby ARS were third, tall Trees CG fourth and the Camb Hams B-team fifth. All the top teams were well spaced in terms of points, so it would have taken quite some effort for one of them to move ahead of any of the others.

Camb Hams dominated 2m AFS, scoring almost as many points as it is possible to. Grimsby ARS were second and Trowbridge and District ARC third. Hereford ARS were fourth and Harwell ARS fifth. All the top teams were well spaced in terms of points.

On 80m/40m there are three AFS contests. On CW, Aberdeen ARS came first. The teams that came second to fifth were fairly closely spaced, so with a little more (or less) effort there could have been place switching between Bristol CG, Grimsby ARS, Camb Hams and Newbury & District ARS. On SSB, Camb Hams came first, with Aberdeen ARS a close second. The third to fifth places teams, Cray Valley ARS, Bristol CG and Grimsby ARS, were separated by just a few points. This year Grimsby ARS won the datamodes leg, pushing Norfolk ARC back into second place. Camb Hams were third, Newbury fourth and Tall Trees CG fifth.

Camb Hams won 70cm AFS comfortably, with Grimsby ARS second. Harwell ARS and Sheffield & District WS were closely spaced, in third and fourth places respectively. Worksop ARS came fifth.

Overall, Camb Hams won the Series for the third year in succession.

RSGB HF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Mon 2 Sep	Pioneer FT4 Series	1900-2000	FT4	3.5	Report + 4-character Locator
Sat-Sun 7-8 Sep	SSB Field Day	1300-1300	SSB	3.5-28	RS + SN
Mon 9 Sep	80m Autumn Series	1900-2130	SSB	3.5	RS + SN
Wed 18 Sep	80m Autumn Series	1900-2130	CW	3.5	RST + SN
Thu 26 Sep	80m Autumn Series	1900-2130	Data	3.5	RST + SN

RSGB VHF Events

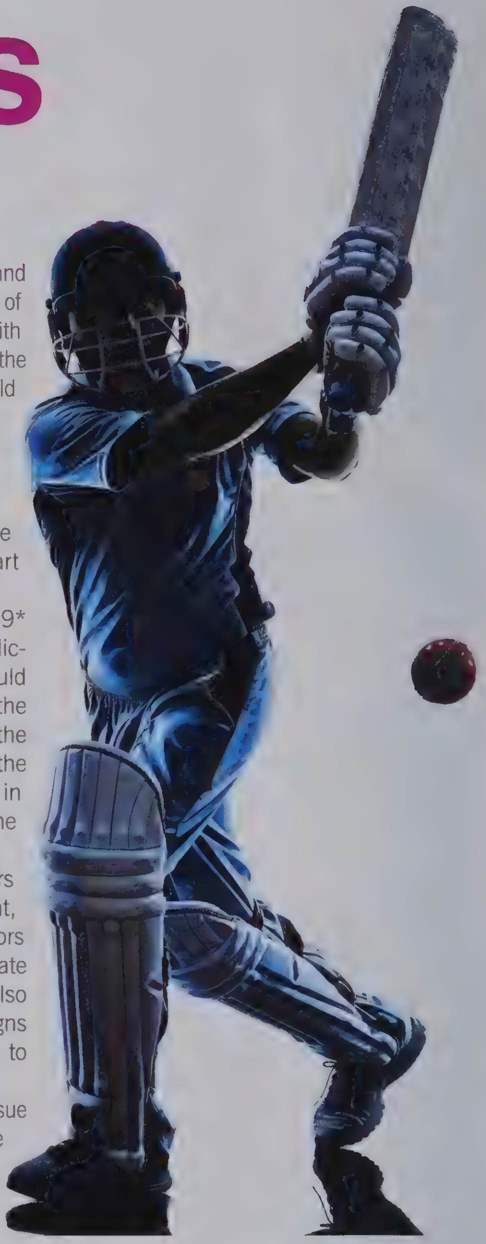
Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Tue 3 Sep	144MHz FMAC	1800-1855	FM	144	RS + SN + Locator
Tue 3 Sep	144MHz MGMAC	1800-1855	MGM	144	Report + 4-character Locator
Tue 3 Sep	144MHz UKAC	1900-2130	All	144	RS(T) + SN + Locator
Sat-Sun 7-8 Sep	144MHz Trophy +	1400-1400	All	144	RS(T) + SN + Locator
Sun 8 Sep	5th 144MHz Backpacker	1100-1500	All	144	RS(T) + SN + Locator
Tue 10 Sep	432MHz FMAC	1800-1855	FM	432	RS + SN + Locator
Tue 10 Sep	432MHz UKAC	1900-2130	All	432	RS(T) + SN + Locator
Thu 12 Sep	50MHz MGMAC	1800-1900	MGM	50	Report + 4-character Locator
Thu 12 Sep	50MHz UKAC	1900-2130	All	50	RS(T) + SN + Locator
Sun 15 Sep	70MHz AFS §	0900-1200	All	70	RS(T) + SN + Locator
Tue 17 Sep	1.3GHz UKAC	1900-2130	All	1.3G	RS(T) + SN + Locator
Thu 19 Sep	70MHz UKAC	1900-2130	All	70	RS(T) + SN + Locator
Tue 24 Sep	SHF UKAC	1830-2130	All	2.3-10G	RS(T) + SN + Locator

Best of the Rest Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange/info
Sat 31 Aug - Sun 1 Sep	UKEICC DX SSB	1200-1200	SSB	3.5-28	RS + SN + District code
Wed 4 Sep	UKEICC 80m	2000-2100	SSB	3.5	4-character Locator (Grid) square
Sat 7 Sep	CWops CW Open	0000-2359	CW	1.8-28	SN + name (three 4-hour sessions)
Sat-Sun 7-8 Sep	All Asian DX	0000-2359	SSB	1.8-28	RS + age (YLs send 00)
Sat-Sun 7-8 Sep	IARU Region 1 Field Day	1300-1300	SSB	3.5-28	RS + SN
Sat-Sun 7-8 Sep	IARU 144MHz	1400-1400	All	144	RS(T) + SN + Locator
Sun 8 Sep	WAB 2m QRO Phone	1000-1400	SSB/FM	144	RS + SN + WAB square
Sat-Sun 14-15 Sep	WAE DX SSB	0000-2359	SSB	3.5-28	RST + SN (Eu works non-Eu only)
Sun 15 Sep	UKuG	0900-1700	All	24-76G	RS(T) + SN + Locator
Sun 15 Sep	IRTS 70cm Counties	1300-1330	SSB/FM	432	RS(T) + SN (EIs & GIs also give county)
Sun 15 Sep	IRTS 2m Counties	1330-1500	SSB/FM	144	RS(T) + SN (EIs & GIs also give county)
Sun 15 Sep	BARTG Sprint 75	1700-2100	RTTY	3.5-28	SN
Sun 22 Sep	PW 70MHz	1200-1600	All	70	RS(T) + SN + Locator
Wed 25 Sep	UKEICC 80m	2000-2100	CW	3.5	4-character Locator (Grid) square
Sat-Sun 28-29 Sep	CQWW DX RTTY	0000-2359	RTTY	3.5-28	RST + Zone (UK=14)
Sun 29 Sep	UKuG	0600-1800	All	5.7, 10G	RS(T) + SN + Locator

In the case of differences between this calendar and the Contest Committee website, the website takes precedence.
+ VHF Championship event § Super League event

RSGB Cricket World Cup Radio Marathon 2019 – Draw Stumps



End of the Innings – what was it about?

The RSGB CWC Radio Marathon was organised on the HF bands, to coincide with the ICC Cricket World Cup (CWC) tournament, held in England and Wales between 30 May and 14 July this year.

Radio Marathons are competitions that involve making QSOs in order to chase awards in a fixed time-frame. For the CWC Marathon, our award chasers had 31 UK and nine International callsigns with which to have contacts. UK callsigns had a unique GB19 prefix. For each callsign, QSOs were counted on three modes and on each of nine bands (except no SSB on 30m). The chase for QSOs could become addictive and operating using the special callsigns was an interesting experience, often with huge numbers of callers.

The challenge for the RSGB was to find sufficient Members who were willing to activate the 31 callsigns on each band and mode to give the award chasers an opportunity to maximise their scores.

Marathon progress was tracked using the Hamlogs website. All QSOs were uploaded so that participants could regularly check their status and could target the callsigns, bands and modes that they needed to achieve the next level of award.

Headline figures

QSOs including both GB19* and International callsigns: **440,442**
QSOs for the 31 GB19* callsigns: **371,489**
Unique callsigns that appeared in the GB19* logs: **44,774**
UK and Crown Dependency callsigns in GB19* logs: **4,492**

Our final QSO count exceeded our expectations; by numbers of contacts, the marathon was significantly larger than any previous coordinated activation by RSGB members.

How did this come about?

In 2018, the RSGB Contest Club used one of its historic callsigns in a radio marathon to coincide with the FIFA Football World Cup in Russia.

With over 50,000 QSOs and much experience gained, we were keen to organise something similar. Our planning group comprised the RSGB HF Contest Committee plus Bob Whelan, G3PJT.

At the time of the 2018 RSGB Convention we had identified that the Cricket World Cup was coming to England and Wales in 2019 and that it had a regional element – the locations of the Cricket Grounds correlating quite well with the RSGB regions. The ICC abbreviations for the teams had two or three characters that could provide suitable suffixes for Team callsigns.

Ofcom

There were two key requirements to agree with Ofcom before we could signal the start of play for the marathon:

1. The context for using the special GB19* callsigns would not be the usual 'public-facing' special callsign event but would be an international activation, where 'the public' are other radio amateurs in the international radio community. In the event, some GB19* activations were in public locations, but that was not the norm.
2. The allocation of callsigns to activators would be managed during the event, rather than in advance. Our operators would be able to request slots to operate at relatively short notice and would also be able to operate using different callsigns so that we could balance the activity to accommodate our award chasers.

After some discussion, Ofcom were able to issue an NoV for all 31 callsigns as variations to the RSGB Contest Club callsign, G6XX. This meant that RSGB Members who joined the Contest Club could operate using an appropriate GB19* callsign in addition to those of our operators who had been members previously. Thanks to Ofcom for enabling this hugely successful event.

Marathon logistics

With 31 callsigns available, we recruited a team of volunteers to coordinate the operation of one or two callsigns each; taking responsibility for their callsigns and recruiting local operators or clubs to share the activation.

The coordinators maintained an activation schedule using a QRZ.com page. Anyone planning to operate could check the availability of a callsign and request a time-slot from the coordinator.

After the operating session, the coordinator received the log from the activator as an ADIF file, to upload to the Hamlogs server. The QRZ.com page for the callsign could be used to confirm that the log had been uploaded.

Although the process of slot booking, ADIF file creation and log uploading was a little cumbersome, the functionality achieved was very good, and this enabled us to make a huge number of QSOs and to achieve a balanced activation of the bands/modes. We were particularly keen not to have any residual un-activated slots, which presented some challenges on less popular bands. We found few stations were equipped for 12m or 160m.

Nick Totterdell, G4FAL
hfcc.chair@rsgb.org.uk

Fred Curtis, G3SVK, one of our leading activators.

UK callsign activators

We had some 200 RSGB Members operating using the GB19* callsigns. Some were operating from competitive contest stations and others using very simple wire aerials and low power. The most popular modes were CW first, SSB second and FT8 third; each mode was responsible for in excess of 100,000 QSOs. We were able to exploit the current popularity of FT8 in its role as a weak signal mode that is effective at low signal-to-noise ratios, with activators able to operate successfully from locations that are electrically noisy.

Leading batsmen

Gordon Higgins, G3PXT was the coordinator for GB19SL – the Sri Lanka callsign. Gordon not only ensured that GB19SL was the Team callsign with the highest number of QSOs but he also activated the twenty other England callsigns, making a total of over 21,000 QSOs for the marathon.

Fred Curtis, G3SVK, steadily worked his way through all the 21 England callsigns, with 12,106 QSOs to his credit, mostly on CW.

Terry Robinson, GM3WUX kept both the Scottish callsigns on the air for many hours on CW, making around 5,500 QSOs. Terry is one of the most prolific white-stick operators in the UK.

International special callsigns

Our International Activators added 68,953 QSOs to our marathon total and provided more band/mode slots for the award chasers – many thanks to all of them. Here are a few of their comments with QSO count in brackets.

VK19AUS (4,606): we had a blast even with the conditions the way they are for us so far away in Oceania.

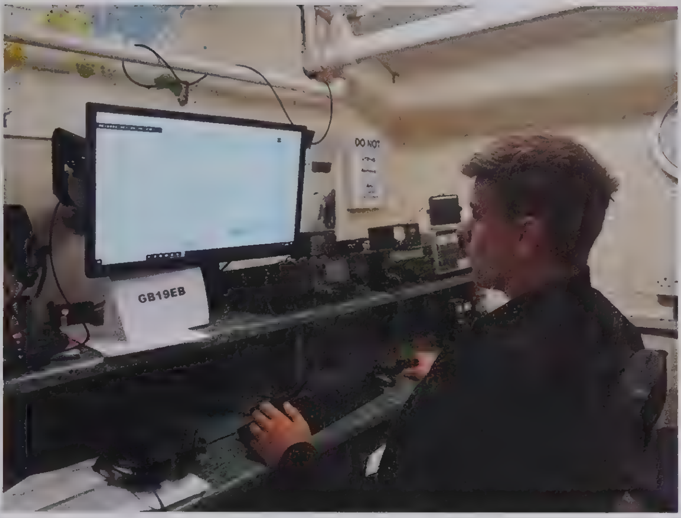
LX19CWC (10,316): here in Luxembourg, we had a great time, trying our best with our small team.

5P19CWC (14,158): as the organiser in Denmark I've had a great time with all the daily incoming logs that were sorted, checked and then uploaded.

PJ4DX (2,089): propagation was reliable only on 20m, though I did find a couple of short openings on 10m and 12m on the very last day of the marathon.

5B19CWC (26,357): the stations operating this callsign were spread over the Pafos area. The club operated every day/night for the entire period.

We also had the following on the air for the event (totals in brackets again): CS2019CWC (4,655), VR2019CWC (4,649), ZS19CWC (820) and AP19CWC (1,303).



Jamie Williams, M0DSV, activating GB19EB at the Wythall Club.

Rich Mortimore, GW4BVJ, coordinated and activated GB19SG.

International award chasers

The clear overall winner was Alec Otulak, SP2EWQ, who made 1,059 unique callsign/band/mode QSOs with GB19* and International activators. His QSOs break down like this: CW: 307, FT4: 6, FT8: 322, PSK: 15, RTTY: 135, SSB: 274. We combine the digital modes for awards, so Alec's total is reduced to 866. Alec is also the highest scoring individual Phone, CW and digital award chaser.

When I asked Alec for some words for this article, his response was: *"My suggestion is perhaps you could ask SP2PBY – it is a club station whose branch operates from a school for blind and visually impaired children in our area. I am quite positive they deserve much more attention than me..."* These comments speak for themselves. Congratulations Alec – you are our winner.

Second came Laci Illés, HA7XL, with a great QSO count of 772: *"Marathon activity always takes a lot of time and you need to be actively monitoring every day and be present in every mode for effective performance."*

Third was Classe Bergman SM3GSK with 740 QSOs: *"As a DXer I have learned that you have to spend lots of time listening on the bands, in this competition especially on 10 & 12 & 15m, not to miss short openings."*

UK award chasers

Top UK spot goes to Darren Collins, G0TSM, who also activated

Classe Bergman, SM6GSK, completed 740 qualifying QSOs with CWC stations.

Steve Telenius-Lowe, PJ4DX, batted for the West Indies.

GB19RB. Darren made 439 qualifying QSOs and came from behind in the last few days to become the clear winner.

Terry Bucknell, G4AFS, who also activated GB19RG, was second with 388; having led the field for some weeks he missed the last four days due to a holiday in Croatia. Terry engaged with FT8 for the first time to achieve a competitive position. Terry's station was 100W to an inverted L, tuned at the base with an Auto Matching Unit, which really lent itself to snappy band changes.

Marathon Scorecard

QSO totals for each mode for all 31 GB19* callsigns

CW	134,012
SSB	122,469
FT8	101,969
RTTY	10,534
PSK	1,659
FT4	825
SSTV	12
JT65	7
FM	2
Total	371,489

UK Stations Worked	Foundation	Intermediate	Full	All
England	187	427	2,885	3,499
Scotland	57	40	316	413
Wales	30	40	248	318
Northern Ireland	23	25	162	210
Isle of Man		5	15	20
Jersey			23	23
Guernsey			9	9
Totals	297	537	3,658	4,492

How many stations made multiple QSOs with GB19* Stations?

Number who made 10 or more	5,823
Number who made 100 or more	716
Number who made 500 or more	19

Top Ten Countries worked by the GB19* stations

1	Germany	17.2%
2	Poland	9.2%
3	European Russia	8.6%
4	England	7.3%
5	Italy	6.7%
6	Czech Republic	5.2%
7	Ukraine	4.2%
8	USA	4%
9	Spain	3.5%
10	France	3.2%

In third place was Brian Sparks, GM4JYB, with 356, who also activated GB19CGM.

Top Intermediate was Neal Giuliano, 2E0MNG, with 135 QSOs, mostly SSB, and top Foundation was Gleason Bradburn, M3ECT, with 184 QSOs – a mix of CW, SSB and datamodes.

Country totals

More than 200 DXCC entities were logged by GB19* stations. Sixty-seven of those QSOs were with stations in Alaska (mostly 20m), which is usually conspicuous by its absence. Also 2,718 QSOs were made with stations in Japan (80m – 12m), which included some excellent runs on the higher bands.

QSOs with the CWC team nations

The combination of summer propagation and our being at the bottom of the sunspot cycle meant that we were very pleased that our GB19* callsigns were able to complete QSOs with each of the nine other countries who were participating in the cricket tournament. Some of these are quite rare DXCC entities.

Country	Prefix	QSOs
South Africa	ZS	170
Australia	VK	97
West Indies	Various	77
India	VU	42
New Zealand	ZL	25
Pakistan	AP	6
Afghanistan	YA	4
Sri Lanka	4S	3
Bangladesh	S2	2

What next?

International interest in the marathon was second only to that attracted by a major DXpedition. We met or exceeded our objectives – particularly in enabling RSGB Member operators to enjoy activating a sought-after callsign.

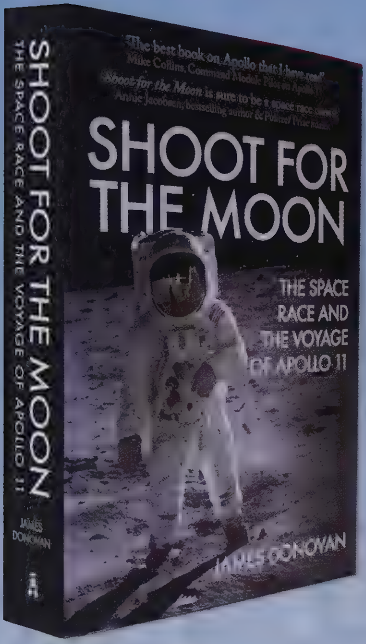
We will look for future opportunities to facilitate RSGB Members to engage in International Radio Marathons – either those organised from other countries or a future marathon organised by the RSGB.

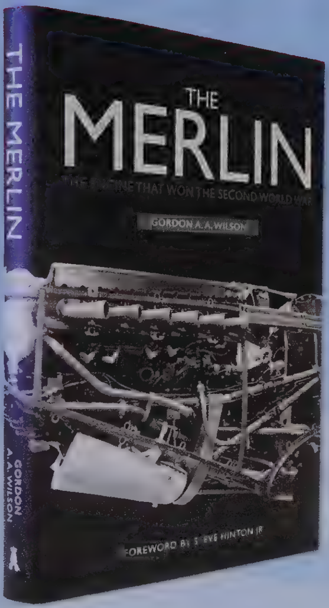
More marathon information can be found on the RSGB website at www.rsgb.org/cricket.

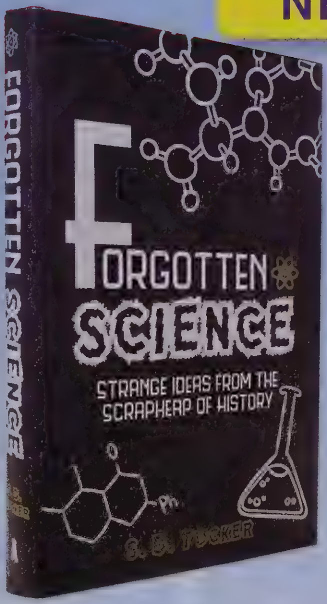
Summer Reading

RSGB SHOP

NEW







Shoot for the Moon

The Space Race and the Voyage of Apollo 11

By James Donovan

Fifty years after the Apollo 11 mission made history, this new maxi paperback book tells the epic story of the astronauts, flight controllers and engineers.

On 20 July 1969, Neil Armstrong and Buzz Aldrin became the first humans to walk on the Moon. Perhaps the world's greatest technological achievement – and a triumph of spirit and ingenuity. The Apollo program involved more than 410,000 men and women dedicated to winning the Space Race.

Seen through the eyes of those who lived it, *Shoot for The Moon* reveals the dangers, challenges and determination that defined not only Apollo 11, but also the Mercury and Gemini missions that made it possible. This is the definitive and thrilling account of one of humankind's most extraordinary feats of exploration.

Shoot for the Moon delivers many extra details not covered by others. If you are interested in this period of our history this is a book not to be missed.

Size 160x240mm, 488 pages,
ISBN: 9781 4456 9907 3
Non Members' Price £19.99
RSGB Members' Price £11.99 (40% off)

The Merlin

The Engine That Won the Second World War

By Gordon A. A. Wilson

The Rolls-Royce Merlin is the most recognisable aero engine in the world. It powered the Spitfire and Hurricane, as they defended the shores of Britain against the Luftwaffe, foiling Hitler's plans to invade in summer 1940. It also powered a host of other WWII aircraft from the iconic Lancaster bomber to the equally iconic P-51 Mustang. Retired military and commercial pilot Gordon Wilson tells the story of the development of the engine and its operational use during the war.

The American P-51 Mustang was originally built for the RAF and its use of the Merlin, built under licence in the US, turned it intoa hugely successful aircraft. You will find information here about the Lancasters and Halifaxes of Bomber Command as they went on their missions, and the 'wooden wonder', the Mosquito, all powered by the Merlin.

This hardback book contains detail on the usages of the 64 variants of the engine. There are also real stories of the people, the use and development of the aircraft the Merlin was fitted too. A great read and recommended to anyone interested in the aircraft of WWII.

Size 160x240mm, 272 pages,
ISBN: 9781 4456 5681 6
Non Members' Price £18.99,
RSGB Members' Price £12.99 (31% off)

Forgotten Science

Strange Ideas from the Scrapheap of History

By S. D. Tucker

Science has a reputation as the most logical and rational of human pastimes – but this has not always been the case. Some of them were genuine geniuses; others were simply lone loons. History is littered with their wreckage, and this hardback book tells the story of the very strangest.

From the inventor Nikola Tesla, who fell in love with his favourite pigeon and tried to broadcast his own thoughts, to the wannabe chemist August Strindberg, who injected apples with drugs to see if they could get high, numerous scientists have conducted bizarre experiments down the centuries. This book is packed with stories like this and from the most improbable to the frankly disturbing they make fascinating and thought-provoking reading.

Proposing that science has become a kind of modern religion, and telling the tale of such noted pseudoscientific fads and fallacies as alchemy, spontaneous generation and the doomed quest to raise the dead, *Forgotten Science* can make you laugh at the same time as making you think. Science at school was never this weird.

Size 160x240mm, 272 pages,
ISBN: 9781 4456 5681 6
Non Members' Price £18.99,
RSGB Members' Price £9.99 (47% off)

FREE P&P

Developments in radio receivers

Today we turn on our receivers with scarcely a thought as to how they work. It was not always like that, as we shall see.

At the beginning of the 20th century, radio was confined to specialised purposes such as maritime communications. Everything was by Morse code and the idea of broadcasting to the general public was still a couple of decades away. There were no valves and the only semiconductors were natural materials.

To make the Morse signals apparent to the radio operator required techniques that are alien to today's technology. An early but well-established device was Branley's coherer. These days, the few original survivors are prized museum exhibits but I've made a coherer out of modern materials (**Photo 1**). An insulating plastic tube is partially filled with iron filings and its ends stopped up by conductive brass screws. A connecting wire is soldered to the outside head of each screw. When exposed to a sufficiently strong radio signal, the filings tend to form a conductive pathway, that is they 'cohere' together. When this happens, a small electric current can be passed through the device between the connecting wires. The current could flow in a circuit that is completed by the coherent filings and that applies power to a bell. To stop conduction, the filings must receive a light physical impact and the striking hammer of the bell can be arranged to do this. Hence the bell rings in time with the Morse characters.

Cat's whisker

The ship's radio operator had to be expert at maintaining such delicate apparatus and was not actually hearing the signal off the air, rather listening to a bell that sounded in sympathy with the received signal or monitoring some alternative indirect device.

To actually listen to the signal, certainly to perceive sounds such as speech, a different method was needed. As broadcasting became established in the 1920s many people were interested in reception but could afford only modest equipment. Many listeners built their own sets and it was in response to this demand that *Practical Wireless* was founded, the first edition being published on Saturday 24 September 1932.

For the more wealthy, a valve set was a luxury possession. The rest of us would have made do with a cat's whisker detector (**Photo 2**). This relied on the natural semiconducting properties of crystals of material such as galena (lead sulphide, PbS, a combustion product found up chimneys) or pyrites (such as fool's gold). The galena crystal is the irregular, rather shiny, lump inside the right-hand end face of the transparent tube. It is retained in a holder that can be detached by turning the knurled head projecting from the right-hand end. Also in the tube is a silver wire, the cat's whisker, that is shaped into a helical spring at one end and straightens out where it reaches the crystal at the other. The end of the wire that touches the crystal is sharp. Mounted on a pivot, the wire is positioned by the listener to find a sensitive spot on the crystal that gives clear reception. At the leftmost end of the device is a tapered finger-grip that the listener manipulates so as to move the cat's whisker. Please note that this is a crystal set because of the piece of galena: the name is nothing to do with quartz crystal resonators or even piezo-electric crystal earpieces.

The detected signal was weak because the only source of power in this receiver was the miniscule amount of energy arriving on the aerial from the transmitter. Sensitive headphones were the order of the day (**Photo 3**). Looking at the outer face of one of the earpieces (**Photo 4**) reveals a British Broadcasting Company (BBC) symbol. The pattern of this symbol dates the headphones between the end of 1922 and the autumn of 1924. Radio programmes had to be paid for, so 3d (old money) was levied on the purchase of each earpiece (so this double earpiece headset attracted a fee of 6d).

Restricted covenant

"No pole aerial or other apparatus in connection with wireless telegraphy or telephony shall be erected within 40 feet of the front boundary nor shall any such thing exceeding 40 feet in height above the ground level be erected or allowed to remain upon any part of the premises." So reads the covenant entered into by the first purchaser of my house in spring 1929. Harvesting even that miniscule power from the airwaves required a sizeable aerial and an elevated wire running the length of the garden would have been typical. By 1929, broadcasting had caught on sufficiently for the vendor of these suburban houses to want

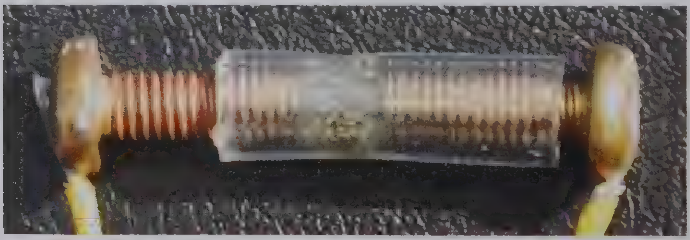


PHOTO 1: A coherer made by the author from modern materials.

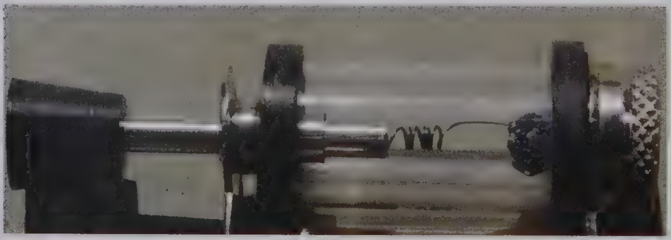


PHOTO 2: A reproduction cat's whisker.

PHOTO 3: Headphones from the cat's whisker era.

PHOTO 4: This earpiece carries useful information stamped into its case (see text).

PHOTO 5: A vintage aerial lead-in rod. The brass rod is surrounded by insulating ebonite.

to limit unsightly aerials from detracting from the leafy ambience.

To feed the external aerial into the house a lead-in rod was often fitted. An example is shown in **Photo 5**. This was a brass rod, threaded at each end to take terminal nuts by which the wires were connected. The rod passed through an ebonite tube (providing insulation) and the entire assembly was pushed through a hole bored straight through the wooden window frame. The illustrated example has, unfortunately, broken in the middle and there is evidence of white paint that contaminated part of it when the house was decorated some time ago. When preparing the window frame for repainting, take care with the blowtorch. One touch of the flame and the ebonite goes up in a considerable cloud of smoke that fills the room and makes the decorator unpopular with the householder.

Valves at last

Even early valve sets also relied on such big aerials. The valves had a limited life and were expensive, big business for the radio dealers of those days. On top of all this was the problem of a power supply. Valves usually need a high voltage in order to function (but see the hybrid car radio, later), plus a low voltage, but with plenty of current, for their heater filaments. Not all houses were on the mains ("had the electric light", as people would say) and mains supplies varied throughout the country – various voltages of AC or DC). Many listeners powered their sets from batteries (**Photo 6**). On the left of the photo is a wet lead-acid accumulator. In those days, valve heaters were often designed to run off 2V because this is what an accumulator produced. The technology is the same as one cell of a car battery, wherein six cells provide 12V when in series. Like the car battery, the accumulator would run down and need recharging, which paradoxically required a mains supply. For some reason, cycle shops often offered this facility and there was no compunction in carrying these acid-filled glass vessels in public from home to shop.

PHOTO 6: Batteries for a valve radio.

As to the high tension, very little current was drawn so a suitable dry battery was surprisingly much smaller than the accumulator. An example is to the right of the photo and, as is typical with survivors from that era, rather looks its age. In fact this dry battery is more recent than the accumulator as it also has a low voltage supply for later generation, less power-hungry, 1.5V valve heaters.

Wartime necessity

During the War, radio was promoted from luxury to necessity. Materials and manufacturing resources were scarce and the only set on sale was the one-design Wartime Civilian Receiver, medium wave only, with Forces and Home (later to become Home Service then BBC Radio 4) being the only stations on the glassless dial (**Photo 7**). Looking inside (**Photo 8**) the considerable size of the valves, two of which appear like prominent red bottles, is apparent.

To maintain civilian morale, with helpful information, positive news, the voice of 'Winnie' Churchill, the music of Victor Sylvester and perhaps some propaganda, the government deemed it worthwhile to divert precious effort into making these sets. Unfortunately, the various Lord Haw-Haws exploited the opportunity for Germany to be calling. The listening populace stoically regarded these interruptions as comic interludes that, at worst, distracted from writing down the steps during Come Dancing. Think of the resources wasted by the Germans in constructing a high-powered transmitter that was frequency-locked to the BBC's signal.

Next month

Next month we'll conclude with a look at the impact of widespread mains electricity, the birth of the portable radio era, transistors, and how valve radios paved the way for in-car entertainment.

Godfrey Manning
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cgmm2@btinternet.com

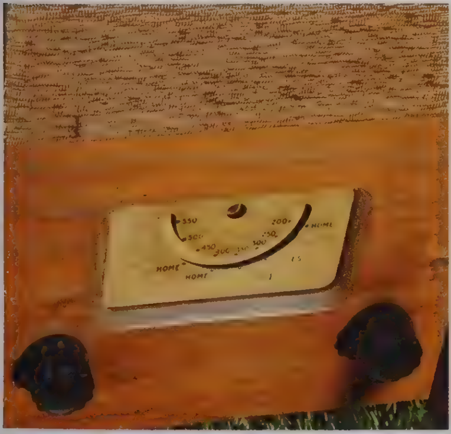

PHOTO 7: A wartime civilian radio that only admitted the existence of two British stations.

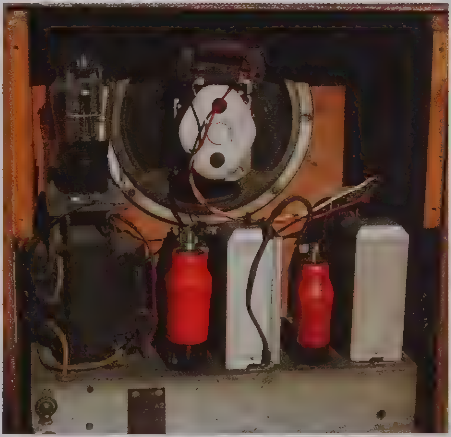

PHOTO 8: Those big red bottles inside the wartime radio are valves.

[illegible] The deadline for the October issue is 26 August and for November it's 23 September. For GB2RS, [illegible]

CLUB EVENTS CALENDAR

INTERNATIONAL

Pafos Radio Club, Cyprus
Richard, 5B4AJG, 5b4ajg@gmail.com
Meets 3rd Thursdays at the Hole in the Wall Restaurant, Coral Bay, 6 for 6.30. Visitors welcome.

RSGB CONSTRUCTION COMPETITION

12-13 OCTOBER 2019

If you are entering a club construction competition, why not also submit it to the annual RSGB construction competition? Even team entries are allowed for a group build club project.

Entries covering any aspect of amateur radio are welcome – software, antennas, test equipment, receivers and transmitters – the possibilities are endless.

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20 Second 144MHz DF hunt

Edinburgh & District ARC
Norman, GM1CNH, 0774 094 6192
2, 9, 16, 30 Club net
7-8 /P for 144MHz trophy contest
14, 23 Meeting and social evening
27-28 Attending National Hamfest

Kilmarnock & Loudoun ARC
Len, GM0ONX, Klarcinfo@gmail.com
3, 17 Activity and training
10, 24 Club night

Lomond Radio Club
Barrie, GM4HEL, gm0kzx@googlemail.com
5, 12, 19, 26 Club night

Mid Lanarkshire ARS
Joseph, 2M0JHY, mlarsclub@gmail.com
6, 13, 20 Club night, tuition and OTA
27 No meeting

Wigtownshire ARC
Clive, GM4FZH, info@GM4RIV.org
5 Discussion on kits to be built
12 AGM
19, 26 Club night
21 Antenna building (GM4FZH QTH)

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

RR: Denny Morrison, GM1BAN, RR2@rsgb.org.uk

Aberdeen ARS
Fred, GM3ALZ, 01975 651 365, www.aars.org.uk
5, 26 Junk sale / Construction & OTA
7-8 SSB Field Day, Dunecht
12 Construction competition judging
19 Talk by construction comp winner
21-22 ROTA weekend at Royal Deeside Railway

Inverness & District ARS
John, GM0OTI, InvernessRadioSociety@gmail.com
4 Club net, 8pm, 145.575MHz & GB7BI slot 1 475
11, 25 Club night

REGION 3: NORTH WEST

RR: Kath Wilson, M1CNY, RR3@rsgb.org.uk

Bolton Wireless Club
boltonwireless@gmail.com
9 Autumn Series SSB contest
23 Interfacing PCs and transceivers, Evan, M0TJU

Central Lancs ARC
Peter, G3UCA, g3uca@blueyonder.co.uk
7 Monthly meeting, 11am
8, 15, 22, 29 Net, 1.940MHz, 11am

Chester & District RS
Bruce, M0CVP, 01244 343 825
3, 10 2m UKAC / Committee meeting
17 Construction competition
24 Practical HF delta loops, Glynn, GW4MVA

Macclesfield & District RS
Greg, M0TXX, Info@gx4mws.com
2 GX4MWS on the air
9 Club activation from Gun Moor
16 Fox hunt in Congleton
23, 30 Film night / Construction night

Newton le Willows ARC
Lee, M0LGL, 0741 483 6945
5, 12, 29, 26 Club night
7 Activity Club / exams

Oldham Radio Club
Mike, M1CVL, 0740 276 3203
1, 8, 15, 22, 29 Multi-mode digital net, 9.30am
2 C4FM simplex net, 7.30pm, 144.6125MHz
4, 11, 18, 25 2m FM net, 8pm
5, 12, 19 Club night
14 CHOTA, GB2CCP, Christ Church, WN7 4HT
16 D-Star simplex net, 7.30pm, 144.6125MHz
26 Club night & construction group

South Manchester R&CC
Ron, G3SVW, 01619 693 999
1, 8, 15, 22, 29 SSB net, 10.30am, 3,637kHz
3, 10, 17, 24 FM net, 8pm, 145.575MHz
5, 26 Morse practice / mini lectures
12 Aerial & propagation clinic, Ron, G3SVW
19 Equinox surplus equipment sale

Stockport Radio Society
Heather, M6HNS, 0750 690 4422
3 Interfacing PCs and transceivers, Evan, M0TJU
6, 13, 20, 27 Net, 433.575MHz, 7.30pm
9, 23 Advanced tutorial 1 & 2
10 Net, 51.550MHz FM, 7.30pm
12, 25 Net, 145.375MHz FM, 7.30pm
17, 24 Radio night / Skills night
28-29 CQ WW RTTY 48hr Contest

Wirral ARS
Bill, G4YWD, 0780 488 4245
3, 10, 17, 24 Natter night
4 Vincent talk
5, 12, 19, 26 ATV OTA & construction night
6, 7-8 SSB NFD setup / SSB NFD
11, 25 G3NWR OTA
14-15 ATV activity weekend
18 Post SSB Field Day

REGION 4: NORTH EAST

RR: Ian Douglas, G7MFN, RR4@rsgb.org.uk

Angel of the North ARC
Nancy, G7UUR, 0799 076 0920
2, 30 On the air
9, 14 Rally planning / Fog on the Tyne Rally
16, 21 Enrolment, prep for ROTA / ROTA
23 On the air & prep for E Day
28 E Day with Raspberry Pi, Central Library

Pontefract & District ARS
Nigel, G0BPK, g0bpk@roydmoor.com
3, 5, 7, 8, 10, 12, 14, 15, 17, 19, 21, 22 Operating GB4BOB
27-28 National Hamfest

Ripon & District ARS
David, G3UNA, 01423 860 778
5, 12, 19, 26 Club night

Sheffield & District Wireless Society
Krystyna, 2E0KSH, 0788 406 5375
4 Bring & Buy, Rutland Hotel, 8pm
7-8 144MHz Trophy Contest & HF SSB Field Day

Spen Valley ARS
Russell, G0FOI, 01274 875 038
5, 19 Shack meeting/on air

Tynemouth ARC
mail@g0nwm.com, www.g0nwm.com
6 Closed
13, 27 Club night
20 Working satellites/ISS

York Radio Club
www.yorkradioclub.uk,
contactus@yorkradioclub.uk
1 Breakfast meeting, 10am
4, 11, 18, 25 Club net, 8pm, 145.450MHz
5, 12, 29, 26 Club night & training

REGION 5: WEST MIDLANDS

RR: Martyn Vincent, G3UKV, RR5@rsgb.org.uk

Coventry ARS
John, G8SEQ, 0795 877 7363
2, 9, 16, 23, 20 Net, 145.375MHz FM & 7.175MHz SSB, 8pm
4, 11, 18, 25 DMR net, TG 2345974, 8.30pm
5, 12, 19, 26 Net, 50.175MHz SSB, 7pm
6, 13 Great Egg Race / Fish and Chip supper
14-15 GB0FOC, Coventry Festival of Craft
20 G2FDC 2m DF Trophy 4th round, 8pm
27 Radio workshop and OTA

Gloucester AR&ES
Anne, 2E1GKY, 01242 699 595 daytime
4, 11, 18, 25 Club net, 7.30pm, 145.475MHz FM
5, 12, 19, 26 Club net, 7.30pm, 145.475MHz FM, then 80m SSB

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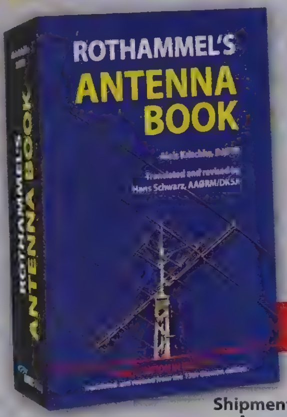

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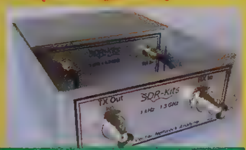

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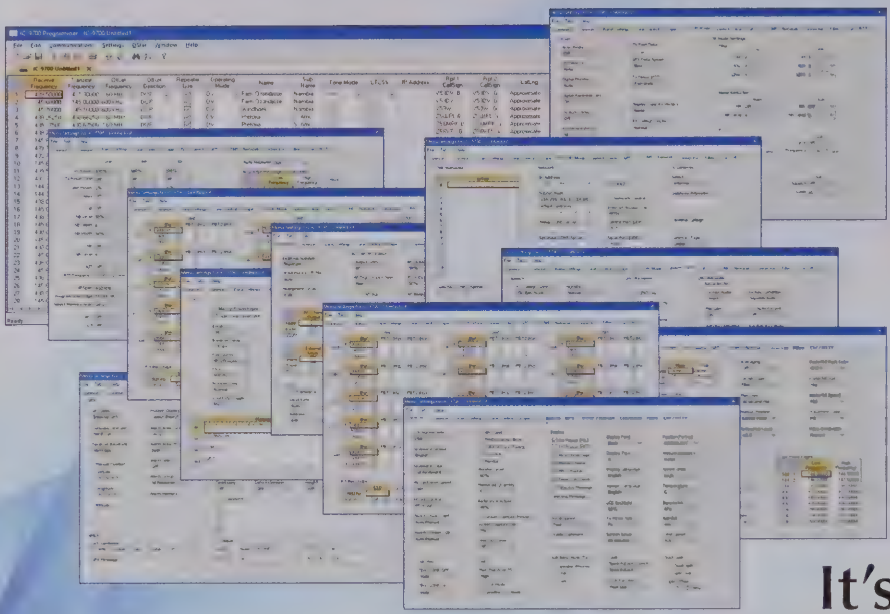

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6, 13, 20, 27 Club net, 7.30pm, 432.220MHz SSB
9 AGM
16, 30 Informal activities
23 Amateur radio and Raspberry Pi, Mike, G4WNC

Hereford ARS
Duncan, M0OTG, duncanjames@supanet.com
1, 8, 15, 22, 29 Net, 3.77MHz, 10.30am then 145.4375MHz, 11am
3, 10, 17, 24 Net, 3.77MHz, 10.30am
6 Homebrew show & tell evening

Malvern Hills RAC
Dave, G4IDF, 01905 351 568
4, 11, 18, 25 Net, 145.350MHz FM, 8pm
10, 24 AGM / Informal

Midland ARS
Norman, G8BHE, 0780 807 8003
1, 28 Visit to Telford Hamfest / National Hamfest
4 Open meeting, OTA & training
11 Committee meeting & training
18 General meeting, social & training
25 Review of new training syllabus & training

Mid-Warwickshire ARS
midwarwicks@gmail.com
7 Field Day
10 Bring an interesting item to discuss
24 EMC, M0OAE

Rugby ATS
Steve, G8LYB, 01788 578 940
3, 10, 17, 24 Activity/contests
7, 14, 21, 28 Activities & contests 2-6pm

Salop ARS
Eamonn, M0MEB, salopamateurradio@gmail.com
3, 10, 17, 24 Club CW net, 4.30pm, 144.070MHz
4, 11, 18, 25 Club net, 8.30pm, GB3LH
12 Construction contest
19 SARS/PARC quiz, Telepost Club, 8pm
26 Blood Bike presentation

Solihull ARS
Stu, G4KUR, solihullradioclub@gmail.com
1, 19 Trip to Telford Rally / club meeting
5, 12, 26 Net, 8pm, around 145.450MHz

South Birmingham RS
Gemma, M6GKG, gemmagordon.m6gkg@gmail.com
1, 2 Stand at Telford Hamfest / Unloading trailer
3, 10, 17, 24 Coffee morning, 11am
5, 12, 19, 26 Training classes, Dave, G8OWL
13, 16 Work in the shack / Checking equipment
27 National Hamfest

Stratford upon Avon & District RS
Clive, G0CHO, 01608 664 488
2, 16, 30 Club net, 145.275MHz FM, 8pm
9 1st RSGB Autumn Series 80m Contest + informal
23 Optimising receiver performance, Harri, G1EIX

Sutton Coldfield ARS
Robert Bird, rob2e0zap@gmail.com.
2, 16, 30 Open net, 145.250MHz, 7.30pm
9, 23 Club meeting
10 Open net, 70.475.00MHz, 7.30pm
24 DMR open net, 7.30pm, slot/local 2 gb7fw

Telford & District ARS
John, M0JZH, 0782 473 7716
1, 88 Hamfest / Hamfest debrief
4 Committee meeting
11 SOTA – My European Tour, M0PLA
25 DX Commander talk, M0MCX

Wythall Radio Club
Chris, G3YHF, 0795 839 5904
1, 8, 15, 22, 29 Club net, 145.225MHz or GB3WL, 8pm

3, 10, 17, 24 Morse class, David, G0HVN
3 UKAC, Social, Workshops
10, 17, 24 Free & easy, workshop
12, 19 UKAC

REGION 6: NORTH WALES

RR: John Pritchard, MW0JWP, RR6@rsgb.org.uk

Meirion ARS
www.meirion-ars.info
4 40 years of Meirion ARS, Louis, 2W0LGG

North Wales RS
Liz, GW0ETU, 0776 019 0355
5, 26 Practical & projects / Natter night
12 General meeting & discussion
14 GB0CTK Churches & Chapels on Air
19 Explosives & repellants, Les Hayward, MW0SEC

REGION 7: SOUTH WALES

RR: Glyn Jones, GW0ANA, RR7@rsgb.org.uk

Aberystwyth & District ARS
Ray, GW7AGG, 01970 611 853
7 Across Wales walk
12 Buildathon, Simon, GW0NVN
21-22 Railways on the Air
26 Club net, 145.500 then 145.550MHz

Pencoed ARC
Madeline Roberts, 0773 837 5775
8 Table top sale, 9.30am, refreshments available

REGION 9: LONDON & THAMES VALLEY

RR: Tom O'Reilly, G0NSY, RR9@rsgb.org.uk

Aylesbury Vale RS
www.avrs.org.uk
11 G4VRS on air, Roger, G3MEH
Bracknell ARC
David, M0XDF, M0XDF@Alphadene.co.uk
4, 18, 25 Open net, 8pm, 145.375MHz
11 Talk

Burnham Beeches RC
Greg, G4EBY, ebytronics@gmail.com
1, 8, 15, 22, 29 Club net, 10.30am, 145.500MHz
2 Overview of IC-9700, G4XDU
16 Open evening

Chesham & District ARS
Jeremy, 07982 183413
4 Technical talk, Terry, G4UEM
18 ASC planning meeting

Edgware & District RS
Mike, G4RNW, 020 8950 0658
12 Learning from call books, Steve, G0PQB
26 Club meeting

Harwell ARS
John, G6LNU, 01235 223 250
6, 13, 20, 27 Club nets: 1.845MHz, 8.30pm; 3.710MHz, 8.45pm
12 ARISS and beyond, M0XTD

Newbury & District ARS
Rob, G4LMW, 0797 088 5614
28 Coffee club

Shefford & District ARS
David, G8UOD, 01234 742 757
12 Your best radio summer activity?
19 Visit to Baldock Radio Station
26 SDR radio, Alan, G4PSO

Silverthorn Radio Club
Robbie, M0HVC, 0742 913 1105
6, 13, 20, 27 Club night, 7.30pm

REGION 10: SOUTH & SOUTH EAST

RR: Keith Bird, G4JED, RR10@rsgb.org.uk

Brede Steam ARS
Dan, M0HOW, m0nuc.bsars@gmail.com
3, 7, 10, 17, 23 Operating at the shack 9am-2pm
14 CHOTA, St Georges Brede
21-22 Railways on the Air

Bromley & District ARS
Andy, G4WGZ, 01689 878 089
17 Millimetric Microwaves, G0FDZ

Crawley ARC
Keith, G3VKW, 01444 412 414
22 Crawley Leg of the Microwave Round Table
25 Plastics in amateur radio

Cray Valley RS
Dave, G8ZZK, 0773 954 9822
5 Highlights of Dayton, Chris, M0YCH
19 Equipment for QO-100, David, G0MRF

Crystal Palace R&EC
Bob, G3OOU, 01737 552 170
6 Power systems, Paul Dyer

Darenth Valley RS
Mike, G8AXA, 0788 415 7776
11 Construction, Rob, G1YRV
25 Natter night & OTA

Dorking & District RS
David, M6DJB, djb.abraxas@btinternet.com
7-8 Polesden Lacey Heritage Day
24 Small loop antennas, Colin, M0GXV

Farnborough & District RS
Mel, M0JMR, sec@farnboroughradio.org.uk
11 Construction contest
25 Introduction to SDR dongles, Clive, 2E0DSD

Fort Purbrook ARC
Chris, G3WIE, g3wie@fparc.org.uk
1 Field weekend: 144MHz & HF NFD

Hastings E&RC
Gordon, M3YXH, 01424 431 909
25 Photos, Alan Harding

Hilderstone RS
Ian, G0PDZ, secretary@g0hrs.org
6-7 SSB Field Day & 2m Trophy
12, 26 Natter night / RAYNET, Colin Bowman

Hog's Back ARC
Ray, G4LUA, 0118 981 4174
9 Natter night
23 SOTA, Andrew, G4AFI

Horndean & District ARC
Stuart, G0FYX, 02392 472 846
6, 20 Club night

Itchen Valley ARC
Chris, G7LWV, secretary@ivarc.org.uk
13 Club meeting
27 TX loop antenna, Alan, G8IPQ

Marsham ARS
Steve, 0758 130 5310, sec.m0vft@gmail.com
14 GB1SAC, CHOTA, St Andrews Church

Mid Sussex ARS
David, M7OBI, 0779 244 2314
6, 20 Radio night / Natter night
13 Air Ambulance presentation
27 Skittles night, Royal Oak, Barcombe

Southdown ARS
Tom, M6ONX, secretary@sars.club
2 Monthly meeting at ESSC
4 Hailsham shack meeting, 10.30am

4, 11, 18, 25 FM net, 145.275MHz, 8.30am; cafe meeting, 12.30pm; CW net, 144.060MHz, 7pm

Surrey Radio Contact Club
John, G3MCX, 020 8688 3322
2 Natter night
16 Fix-it, move-it-on, skills & advice night, social

REGION 11: SOUTH WEST & CHANNEL ISLES

RR: Dean Brice, G0UIL, RR11@rsgb.org.uk

Appledore & District ARC
Alan, 2E0EUZ, 0745 390 4400
16 Open meeting

Callington ARS
Steve, G7HEP, 01566 773154
4 Club night and film

Cornish RAC
Steve, G7VOH, 01209 844 939
4 Committee meeting
5, 19 Main meeting / Social evening

Flight Refuelling ARS
Sue, M0PSZ, info@frars.co.uk
1 Committee meeting
4, 8, 11, 15, 18, 25, 29 club night
5, 12, 19, 26 2m net, 145.350MHz, 8pm
21-22 Foundation course
22 Desert adventures talk

Isle of Avalon ARC
Matt, M3MMZ, 0736 848 7996
6, 13, 20, 27 Club meeting and OTA

Poldhu ARC
Keith, G0WYS, 01326 574 441
10 Introduction to Linux, Antony, G0XPD

Riviera ARC
rivieraarc@gmail.com
5, 19 Club night
14, 21 GB1BOB / GB4BCR

Saltash & District ARC
Mark, M0WMB, 0781 054 8445
5 Acorn Computers, Brian, M0BHG
15 GB5IVE for CHOTA with M0WMB
19 Club night

South Bristol ARC
Andy, G7KNA, 0783 869 5471
5 DX Challenge
12 Table top sale
19, 19-22 ROTA briefing / GB0SDR, ROTA
26 Open house & OTA

Torbay ARS
Kerry, M0KRE, kerry@m0kre.net
1, 8, 15, 22, 29 Nets: 14.270MHz, 9.30am; 145.575MHz, 12 noon
2, 9, 16, 23, 30 Nets: 3.663MHz, 10.30am; 1.982MHz, 8pm; 50.155MHz, 8.30pm
4, 11, 18, 25 Nets: 14.270MHz, 9.30am; 3.663MHz, 10.30am
6, 13, 20, 27 Club night; Net, 3.663MHz, 9.15pm
7, 14, 21, 28 Net, 3.663MHz, 10am

Weston Super Mare RS
Barry, M0JOG, 0750 066 8674
2, 9, 23, 30 Club night
16, 22 Rally planning / Rally

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REGION 12: EAST & EAST ANGLIA

RR: Peter Onion, G0DZB, RR12@rsgb.org.uk

Braintree & District ARS
Edwin, G0LPO, 01376 324 031
3, 17 Club net, 8pm, 145.375MHz
10 Railways on the Air venue update
24 Natter night

Camb-Hams
www.camb-hams.com
3, 10, 17, 24 Net, GB3PI, 8pm

Cambridge & District ARC
Bryan, M0IPO, publicity@cdarc.org.uk
7-8 144MHz Trophy, HF SSB Field day, Chapel Hill
13 Sale of pre-loved equipment
27 Constructors' evening
29 Centenary Celebration, 2pm, non members welcome

Felixstowe & District ARS
Paul, G4YQC, pjw@btinternet.com
2 ESWR post mortem
21-22 Foundation course

Harwich ARIG
Kevan, 2E0WMG, 0749 352 1049
11 Piel Island DXpedition, Kevan, 2E0WMG

Huntingdonshire ARS
Malcolm, M0OLG, 01480 214282
12 Natter night
26 Development of digital television

Langdon Hills ARC
Stuart, G6RAQ, 01268 413 121
13, 27 Club night / Hobby progression

Norfolk ARC
Chris, G0DWV, 01603 898 308
4 Repeater linking, James, M0ZAH
11, 25 Informal, Morse (Bright Sparks 25th)
18 FlexRadio SDR update, Gerald, K5SDR (via Skype)

South Essex ARS
Terry, G1FBW, 0798 607 0040
1 GB2CTM, Canvey Transport museum
10 Model helicopter, Tony, G0JYI
14 CHOTA, St Peters church, Thundersley

Thames ARG
Mark Sanderson, 01268 698304
6 Finding Essex & Kent military monuments, Nigel, M0ICH
14-15 GB2MFM for Military Fixed Monuments
20 Radio projects night
21-22 GB2CMR for Railways on the Air

REGION 13: EAST MIDLANDS

RR: Mark Burrows, 2E0SBM, RR13@rsgb.org.uk

Kettering & District ARS
Ed, M0TZX, M0TZX@yahoo.com
5, 12, 19, 26 Net, 7pm 145.300MHz FM
9-15 GB2HAM, International Air Ambulance Week

Lincoln Short-Wave Club
Pam, G4STO, 01427 788 356
4, 11 Nibble and natter night
5, 19 Club net, GB3LM-GB3LS, 8pm
7 New member induction & open shack, 9.30am
12, 26 Club net on 145.375MHz, 8pm
14 Open shack & Saturday surgery, 9.30am
16, 18 Committee meeting / Formal meeting
21 Hamfest meeting BBQ, village hall, noon
25 Hamfest setup, shack closed
28 National Hamfest staffing, shack closed

Loughborough & District ARC
Chris, G1ETZ, 01509 504 319
3 QRP transceiver project, Brian, G8BUB
10 Digital modes, David, 2E0DFJ
17, 24 Fish & chip night / Practical evening

Melton Mowbray ARS
Phil, G4LWB, 01664 567 972
20 AGM

Nunsfield House ARG
Paul, G1SGZ, pr@nharg.org.uk
2, 9, 13, 16, 23, 30 Shack night
5, 12, 19, 26 Club net, 145.325MHz, 8pm
6 Scams, Andy, G8IYZ
13, 20 Programme planning / ROTA prep, natter night
27 Surplus sale

RAF Waddington ARC
Bob, G3VCA, 0797 116 6250
2, 9, 16, 23, 30 Club net, 145.325MHz, 8pm
6, 20 Club meeting at the shack
13 JOTA, Mark, M0WMS
25-28 Assisting, Bring & Buy, National Hamfest

South Kesteven ARS
Steve, 2E0WCG, 01780 764 419
7-8 RSGB Field Day
13 CW training and social
20 Building VHF/UHF antennas

South Normanton Alfreton & District ARC
Alan, M0OLT, snadarcsec@gmail.com
2, 16 Technical night / junk sale
3, 10, 17, 24 Club net, 6.45pm, 145.475 or 145.450MHz
9, 23 Natter night
30 Reports from Hamfest

Spalding & District ARS
Graham, G8NWC, 0775 461 9701
1 Field day & family BBQ, West Pinchbeck, 11am
6, 13 Club, Q&A + radios
20 Lowband DXing, antennas & propagation, Ken Barnett
21 Pinchbeck Live
27 Closed (National Hamfest 27-28)

Welland Valley ARS
Peter, G4XEX, 01858 432 105
2 Club net, 145.275MHz FM, 7pm
16 Finish loop antenna
27 Club road trip to Lincoln Hamfest

Deadlines
21 August (October edition),
25 September (November edition),
23 October (December edition)

REGION 1: SCOTLAND SOUTH & WESTERN ISLES

GB0DAM was run at Dumfries Aviation Museum in July to get amateurs from across the region to come and operate, to publicise amateur radio and, of course, the Aviation Museum itself.

The Aviation Museum has many aviation exhibits both outside and within buildings. HF conditions were appalling and they had to move the HF station because of interference from (probably) the battery charging circuits in the emergency exit lighting in the control tower.

The eight operators/loggers and helpers came from Wigtownshire ARC, James Clerk Maxwell RS and the Solway ARG. In total, 11 countries were worked.

Thanks to the hosts and all those that helped with the station.

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

A few newer members of **Dundee ARC** recently passed their Foundation exam and have decided to continue their studies. A construction evening allowed the group to achieve part of the Intermediate practical assessment. Hopefully this will be the first of many projects they undertake.

REGION 3: NORTH WEST

Mid Cheshire ARS was pleased to see nice comments and a picture in last month's *RadCom* of the very large radio dial that forms part of a display and workstation commissioned by the club. The dial is a faithful copy of a Pilot radio dial from the 1930s, somewhat magnified. They meet on Wednesdays and enjoy a range of activities, including building uBitx transceivers; they are also keen participants in the VHF and HF NFDs. New members are always welcome and they offer licence courses for Foundation, Intermediate and Full.

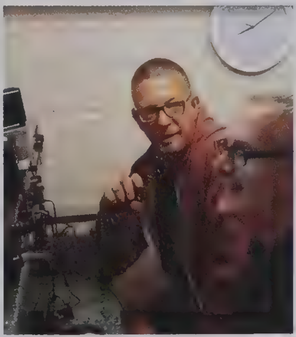
Bury RS successfully ran their first online Advanced exam in July. Congratulations to James, 2E0YMM, Tom, 2E0TFD, Rod, 2E0EVI and Ashley, 2E0HFE, along with trainer Peter, G0GPH. RSGB President Dave Wilson, M0OBW was on hand to guide the Society through its first use of the new system, which worked flawlessly despite having poor Wi-Fi and 4G connectivity available on the day. In practice they found it to be much easier to administer than the paper-based exams and candidates were delighted to get their indicative results immediately.

REGION 4: NORTH EAST

In June, a group of **Sheffield & District WS** members set up a GB0SWS at the Sheffield Heeley City Farm Summer Festival as part of their 100th anniversary events. HF propagation was extremely poor during the day and there was a high noise level at the location. The 40 to 10m antennas were a vertical half size G5RV and Buddipole, both standing in a chicken run to the rear of the farm office block! SSB on 40 and 20m from an IC-7300 raised a handful of contacts, while an FT8 datamode station, using a FlexRadio, had a similar number on the 30m band. In spite of all that, festival visitors found the visual display of the history of SDWS interesting as well as the very graphic demonstration of the QOscar 100 satellite. Barry, G8AGN, using the club call GX5TO, transmitted from his home into the satellite using the Hellscreiber mode and was joined by three other UK amateurs, G8HAJ, G4JNT and G3YPQ. The transmissions were monitored, via the BATC Goonhilly WebSDR, on a large screen at GB0SWS and the birthday greetings clearly seen on a large screen. This 4 four 'quadplex' QSO is a world first for the mode and for amateur satellites! Three days later, GB0SWS was in daily *Sheffield Star* and the weekly *Sheffield Telegraph*.

REGION 5: WEST MIDLANDS

Wythall RC celebrated a busy 6 months with their annual 'Plug and Play' weekend and family barbecue, attracting over 40 members and their families. Club members erected antennas and tried out each other's rigs. To add interest, they operated a Cricket World Cup GB19 call, one of 9 CWC sessions they hosted. Working a pile-up was a new experience for the new licensees, who were amongst 28 Foundation and 8 Advanced graduates from the club's busy 2019 training programme. In June they provided communication for the annual Wythall Fun Run, who in turn helped purchase portable equipment for the work with young people including 18 Scouts who gained their Communications badge later that month. The photo (right) shows Miles, M7ACN and Andy, M6OWP in the club shack with their first pile-up as GB19EB.



REGION 6: NORTH WALES

North Wales RS have been making full use of their facilities with licence training, Intermediate exams, antenna and balun building. The next Special Event Station is GB0CTK for Churches and Chapels on Air on 14 September. Details at www.nwrs.info.

REGION 7: SOUTH WALES

Cwmbran & District ARS raised money Newport-based St David's Hospice Care when a member began treatment. The fundraising spiralled and they ended up donating £642. The photo (right) is by kind permission of David Barnes at DB Public Relations.

REGION 9: LONDON & THAMES VALLEY

Banbury ARS celebrated 50 years and a number of original members, current members, guests and partners were present on 22 June at the club QTH (photo right). With fine weather, people enjoyed a barbecue, chatting and operating the equipment. A 'memories' book was opened in which everyone was invited to add their personal reminiscences of anything club related. It will remain open for the whole of the anniversary year.

Jerry Raehse-Felstead, 2E0HAF is the newly installed Master of Dalhousie And Callsign Lodge No 865 for the coming year. The Lodge welcomes Freemason visitors at its meetings and of course any radio amateur who is interested in learning more. Jerry, 2E0HAF is also a member of Whitton ARG.

Chesham & District ARS plans to run a Foundation course in the autumn and have space for 5 or 6 candidates. The course will take place at the Whitehill Centre. Contact Jeremy, by email to brownjeremy1952@gmail.com

At Verulam ARC's 'antenna shoot-out' in June, the weather was wet and gave another meaning to 'challenging conditions' (right). Nevertheless, Roger, M0RBK quickly set up his shortened vertical rod antenna with its adjustable inductance and four wire earth radials. Once connected to Greg, M0PPG's FT-897, contacts were made on 40m. A wet but successful event. In July meeting, Roger, M0RBK, gave an illustrated talk about the problems faced by the newly licensed, particularly, when having to operate from a small plot. He is a fan of using vertical antennas, with buried radials. Fibreglass poles, such as those used for angling, with an inner radiating wire are easy to erect and take down and they are neighbour friendly.

REGION 12: EAST & EAST ANGLIA

Dorothy, M0LMR was recently asked to talk about her amateur radio journey at an event called *Women in Tech*. Dorothy talked about how she got started and progressed to running her popular **Essex Ham YL** net and making her first EME moonbounce contact. A full video of her talk can be found at sxham.uk/wit

Offshore Radio enthusiast Jim, 2E0RMI gave a fascinating talk to a packed venue at the South Essex ARS. His talk spanned the experiments aboard Marconi's yacht Elettra in the 1920s, through the offshore radio boom in the 60s, right up to the present day. He was joined in the audience by Keith, G6NHU Martello Tower Group who ran a special event station in August onboard Radio Caroline to commemorate the 55th anniversary.

The antenna testing day was one of five events with a broad range of different activities held by Thames ARG in June (photo right). Gary, M0ICG has six large permanent antennas at his QTH and kindly offered space for members to test experimental antennas and bring them to life, often with a bit of help from others and fun in the process.

Essex Ham members supported the Basildon Street Science Festival that brought together scientists and ambassadors for a range of hands-on STEM activities. Radio activities included demonstrations of Raspberry Pi SDRs and Arduino controllers, as well as the opportunity to send greetings messages. During the day, David Burton-Sampson (Mayor of Basildon) and local MP Stephen Metcalfe took up the challenge of making their first contact over amateur radio. There is a short video of the event at sxham.uk/bss

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Norfolk, along with the rest of the country, had been soaked with 6 days of constant rain and blustery wind so it was a relief to see the sun on Sunday morning for the *PW* 144MHz QRP contest! Bittern DX Group were lucky as it stayed dry and sunny all day, turning back to rain and wind the following day for another 5 days. The old faithful 17-element Tonna finally gave up the ghost this year and the replacement, one of the low noise LFA range of Yagi, arrived just in time for the contest. Construction and setting up of the antenna took longer than anticipated and they were two hours late getting the contest started, missing quite a few of the backpackers usually logged. They finished with a score of 25 QSOs and 12 locator squares including G7RAU in the Scilly Isles at 577km. The new antenna performed well. Members taking part were Alec, G3YOA, Adam, M0OAS, Sue, 2E0TSZ, Ian, M0IWB, Thomas, M0TEO and Linda, G0AJJ.

Cambridge & District ARC entered the single transmitter section of VHF NFD in July. Their usual site was not available, so they moved to the edge of the Fens. With the top aerial at 12m, the horizon was a minimum of 4 miles away, and in the direction of the continent the horizon is over 15 miles away, giving a reasonable take off. The afternoon before David, G0LRD, Dave, G6KWA and Richard, G4AWP put the tent up, set up the generators, installed aerials (17-eel Tonna for 2m, 9-ele EA beam for 4/6m) on a trailer mast. The station was an IC-7300 for 4 and 6m and an IC-7300 plus BNOS linear on 2m. Two new operators joined the usual crew: Dave, M0MUX an experienced operator from the Blacksheep Contest Group and Roy, G7SWW, new to contesting. Other operators were Will, G6OPL and Martin, G8OFA. A total of 135 contacts were made between the 2, 4 and 6m bands.

REGION 13: EAST MIDLANDS

Lincoln SWC was at Boultham Park Summer Fair in July using the callsigns GX5FZ and GX6COL. Peter, M0EJL started calling CQ and Pam, G4STO brought out the newly acquired portable BBQ and cooked sausages for the helpers. There was a steady flow of visitors to the station including from **RAF Waddington ARC**.

South Normanton, **Alfreton & District ARC** wish to congratulate Errol, M7ELH on achieving his progression to 2E0FMO. He has already stated work on the Full licence learning. Thanks to the Training and Examination team at the club and, in particular, to trainer Russell, G0OKD as this was his last candidate. Russell is well-known in the Region for his many years of work. Training potential candidates has been the club's main source of new members for many years.

RAF Waddington ARC set up GB0NAM at the Newark Air Museum for Museums on the Air. This coincided with the museums open cockpit event so there were plenty of visitors. 85 contacts were made the furthest was achieved by Mark, M0WMS to CS8ABG in the Azores. A great social event with 17 club members attending. The club set up by the Vulcan and used a Niftylift cherry picker as a very convenient mast.

Sue, G6MNM gave a superb talk and behind the scenes view from her role as a Matron for a local hospital and her role as curator of a collection of historic medical equipment and books, records etc to **Spalding & District ARS**. Andrzej, 2E0FHM demonstrated his camera collection and the way he has developed his portfolio to include astrophotography, infrared photographs and the results obtainable with some basic equipment. Neil, G0JUR, shared his love of music and guitars, demonstrating some from his collection, showing techniques and basic chord grouping how many successful recordings are put together.

Andrew Selby was successful in his Foundation exam and four candidates (Martyn Vickers, Stephen Nugent, Ben Cridland and Nigel Groom) were also successful in their Intermediate exams at **Nunsfield House ARG**. All five studied on their own and took their exams at Nunsfield House. Special thanks to the exam invigilators Tony, G6MWS, Ken, G0JKC. and to Ken, G3OCA .

Konrad, M0KVF gave a talk to South Kesteven ARS on first aid, dealing particularly with CPR and the treatment of burns and shock, all of which are real risks in the hobby. The talk included practical demonstrations. Everyone found something useful as many techniques we had previously been taught had been updated over the years and could save somebody's life. The latest recruit to the club, Andrea Kiddle, aged thirteen is now studying for her Foundation licence for the Duke of Edinburgh award. On her first visit with her grandfather Andrew, G4HVC she was so impressed with the friendliness and enthusiasm of the members, she wanted to join in. The photo shows Andrea Kiddle and her grandfather Andrew teaching her CW. Club chairman Steve Marsh is the proud holder of M0NMA.

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Moonraker 28, 29
Nevada 56, 57, 58, 59
Peak Electronic Design ltd 43
Radioworld 70, 71
RF Parts Company 85
RSGB 9, 11, 33, 67, 74, 75
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Waters & Stanton 36, 37, 38, 39
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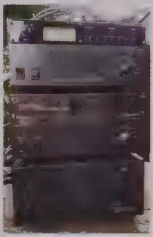

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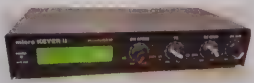

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ONE DISMANTLED ALTRON 10m lattice mast with ground post and winch, £200. Stuart Perry, G0LRX, 0777 197 6521, stuartperry100@hotmail.co.uk (South Croydon).

CA AR88D receiver in working order. 535kc/s-32Mc/s. Downsizing my equipment. Good condition. With handbook, including circuit diagram and component layout. Offers. Buyer collects. Richard, G0FXI, 0117 963 6981, richard.oram@btinternet.com (Bristol).

RELAX IN G3PAI's COTTAGE in rural Burgundy. No charge, just donate what you can to Combat Stress (www.combatstress.org.uk) or Help for Heroes (www.helpforheroes.org.uk). We have space for antennas, even 136kHz, and Wi-Fi. Details at www.charity-cottage.org.uk. John, G3PAI / F5VLF, +33 386 20 25, 50, rosemary.border@gmail.com (58800 CERVON, France).

TWO BEDROOM BUNGALOW. Between Evesham & Stratford on Avon. 400m by 40m plot (4 acres), stables, brick built shack, Versatower, no other houses nearby! ~£490k. Ken Vickers, G3YKI, 0774 029 1373, g3yki@hince.plus.com (Worcs).

YAESU FL2000B HF LINEAR. Reasonable condx for age. Some updates recently completed, soft start, new HT caps and several other minor improvements. £240 ONO. Heavy and no box so buyer must inspect and collect. Denis, G3UVR, 0151 652 7454, g3uvr@btinternet.com (Wirral area).

YAESU FT-301S. From SK. Immaculate condition, like new working condition. Original packaging with mic, manual and power lead, £240 ONO + postage at cost or pick up. Eddie, MM0MUN, 01224 573870, eddiemunro@aol.com (Aberdeen).

YAESU FT-726R SK SALE fitted with 6m, 2m and 70cm modules. Includes microphone, power lead, manual and original double boxes. £250, collect or carriage at cost. Mike, G4OQG, 01249 443037, g4oqg@hotmail.co.uk (Wiltshire).

YAESU FT-897, £400 ono. 4m transverter, 250mW op, 18m Spiderpole, unused, offers. 6-ele log ant, 10-20m Tenadyne T6, th3/4 ant, ETM 3 keyer, numerous old valves (sae for list). Keith, GW3NAS, 0786 011 9210, gw3naskeith@gmail.com (Ceridigion).

WANTED

½" DIAMETER BY ½" LONG ceramic (porcelain) glazed insulating pillars with tapped ends, Millen type. I need 10 but will take what you have. I also need a few longer ones, again ½" diameter, 1-2 inches long. Mike, G3XLB, 0151 216 2210, mikegiddings1@yahoo.com (Liverpool).

FULLY WORKING PLL CARD ('X57-8570-11 TX-RX UNIT', B/11 on diagram Z92-0732-01) for Kenwood TS-2000. Fair price paid plus carriage. Nic Sears, G3YEG, 01983 718487, nicsears@talktalk.net (IoW).

JRC 515 RECEIVER. Collins 51S1 receiver, clean condition. Icom R-9000. Elecraft K2 with all options, good quality build. Also K3, 100W, with all options. All must be in 100% working order. Ilan Paim, G0UUT, 0748 200 4890, elanpaim@icloud.com (Norfolk).

QSL CARDS WANTED. Silent Key clearout or just not wanted – please don't throw them away. I collect QSL cards for historic interest and research. Any date but prior to 1970 preferred. Can collect or arrange collection. Tony, G4UZN, AQuest1263@btinternet.com (Leeds).

SHARKRF OPENSPOT MODEL 1. That's the blue translucent case model without WiFi capability; for club demo purposes. Richard, G8ITB, 0797 710 7179 (eves), g8itb@yahoo.co.uk (Bromley, Kent).

STILL LOOKING FOR a Yaesu FT-73R 70cm handheld, also accessories, microphone/speaker, battery cases, CTCSS module, all shared with the companion FT-23R. WHY? Ken, G3XSJ, 0787 897 0177, g3xsj@btinternet.com (Bristol).

TURBO TUNER 2 wanted, Icom version only. Poul, G7BTP, 0791 294 6370, g7btpuk@gmail.com (NE Lincolnshire).

UP FOR GRABS

LINEAR PSU Farnell H60/25 stabilised bench supply. 0-60V, 0-25A. Free but collection only as it is very heavy. Phil, G8DDN, 0790 507 0352, phil.bennett@talk21.com (Gillingham, Dorset).

HELPLINES

MANUAL FOR HEATHERLITE HUNTER HF linear amplifier. If you have one, or can help, your expenses will be refunded. C James, G0GFY, 0793 247 3601, C.james1@sky.com (Croydon).

MANUALS FOR PYE R150 and Philips T414/412 receivers. These are vintage 19 inch rack units. I need the manuals: I would be able to purchase and cover postage costs. Roger, G7OBC, roger@egerton.myzen.co.uk (W Midlands).

SPECIAL EVENT STATIONS

Details published here were kindly provided by Ofcom. These callsigns are valid for use from the date given, but the period of operation may vary from 1-28 days before or after. To apply for a SES NoV, see tinyurl.com/SES-NoV PLEASE NOTE: when you apply for a SES NoV please make sure you tick BOTH publicity boxes on the application form or your special event cannot be listed here and probably won't be mentioned online or on GB2RS Note: the Event column spellings are as received from Ofcom.

Date	Callsign	Information	Location
01/09	GB2BRS	Bawdsey Radar Station	Woodbridge
	GB4NGR	Narrow Gauge Railway	Lavendon
	GB4SBC	Sierra Bravo Charlie	Kidderminster
	GB5OTC	50 TCARS	Thornton-Cleveleys
	GB6WAB	6WAB	Willenhall
	GB9ABG	Alpha Bravo Golf	Loughborough
06/09	GB1IOW	Isle of Wight	Ryde
	GB2WD	West Dean	West Dean
07/09	GB0LFR	ASE	Grantham
	GB2MFM	Military Fixed Monuments	Basildon
08/09	GB2KAA	Kent Air Ambulance	Headcorn
10/09	GB2HSC	HSC	Liphook
12/09	GB0CTK	ASE	Towyn
	GB2ASC	CHOTA	Beeston Regis
	GB2SCC	COTA	Llandysul
13/09	GB0IVE	IVE	St Ive
	GB0SMF	Saint Mary's Fordingbridge	Fordingbridge
	GB1BOB	Battle of Britain	Torquay
	GB1SAC	SAC	Fairlight
	GB4ASL	All Saints Ladbroke	Ladbroke, Southam
	GB4SJB	St John the Baptist	Coventry
	GB6CCC	Christ Church Coventry	Coventry
14/09	GB0HTP	CHOTA	High Wycombe
	GB0SMP	St Marks Pennington	Lymington
	GB1CCC	Chearsley Cricket Club	Aylesbury
	GB2CCP	ASE	Leigh
	GB4TC	Tickenham Church	Clevedon
19/09	GB0SCR	Swindon Cricklade Railway	Swindon
	GB4VBR	Vale of Berkeley Railway	Sharpness
20/09	GB0AE	Avon Valley Railway	Bristol
	GB0AVR	Avon Valley Railway	Bristol
	GB0SDR	Somerset Dorset Railway	Midsomer Norton
	GB1FLR	Fenland Light Railway	Ramsey
	GB2CMR	Canvey Model Railway	Canvey Island
	GB2EBA	Railways On The Air	Skipton
	GB2WSR	West Somerset Railway	Minehead
21/09	GB0GCR	Great Central Railway	Ruddington
	GB0SRP	Shillingstone Railway Project	Shillingstone
	GB0WHH	ASE	Tremadog
	GB2RDR	Royal Deeside Railway	Banchory
	GB2SDR	South Devon Railway	Buckfastleigh
	GB4BCR	Babbacombe Cliff Railway	Torquay
	GB6RHD	Romney, Hythe Dymchurch	Dungeness
	GB9TMB	Tim Mitchel Building	Winchcombe
24/09	GB4SL	Space Lectures	Pontefract

SILENT KEYS

We regret to record the passing of the following Members.

Name, callsign	Date
Mr R Wheeler, 2E0EYI	1/7/2019
Mr A Lee, G0EDK	14/7/2019
Mr A B Wakefield, G0JSK	12/6/2019
Mr G J Withers, G0VAP	1/7/2019
Dr R Roycroft, G1NXV	1/2019
Mr R M F Inman, G3MYG	1/11/2018
Mr R C Marshall, G3SBA	9/7/2019
Mr N J L Lockett, G4EMB	15/6/2019
Mr C M Palmer, G4FMO	6/2019
Mr A P Athawes, G4RUZ	4/7/2019
Mr D M Dodd, G6DOX	13/1/2019
Mr P Hughes, G8AOZ	16/7/2019
Mr M A Hoare, G8VWJ	26/7/2019
Mr D P T Evans, GW3IVK	15/1/2017
Mr R Howe, GW3PLB	20/6/2019
Mr C B Owen, M0WEN	1/7/2019
Mr M F Jones, M3FJE	25/6/2019
Mr A Simpson, MI0MVP	11/7/2019
Mr E Thomas, MW0BTI	26/6/2019

Please email SK details to sales@rsgb.org.uk or phone 01234 832 700, option 1, so that their Membership will be ended properly and they'll appear in this SK list. We need to know name, callsign and date of death.

Ofcom must also be informed, on 0300 123 1000. We are not permitted to pass on SK details on your behalf.

RALLIES & EVENTS

Members of the RSGB Regional Team will be present at the rallies this month marked with an RSGB diamond.

It's time to tell us about your 2020 rally!

Please send full information
by email to radcom@rsgb.org.uk

1 SEPTEMBER (new venue)

TELFORD HAMFEST & G-QRP CONVENTION

Harper Adams University, nr Telford, TF10 8NB. Details from Martyn, G3UKV on 01952 255 416 [www.telfordhamfest.org.uk]

7 SEPTEMBER

CAISTER LIFEBOAT RALLY

Caister Lifeboat station, Tan Lane, Caister on Sea, NR30 5DJ. Access via car park in Beach Rd. Easy parking. Doors open 9.30am (sellers 8am). Indoor spaces and outdoor pitches available. Raffle. Onsite café & museum will be open. A SES will be on air. Zane, M1BFI, 0771 121 4790, m1bfi@outlook.com [www.m1bfidx.wixsite.com/cl-radio-rally]

14 SEPTEMBER (new date)

FOG ON THE TYNE RALLY

Whitehall Rd Methodist Church Hall, Bensham, NE8 4LH (corner of Whitehall road and Coatsworth Road).

Doors open 10.30am. Entrance is £1.50 and includes an entry for the raffle. There will be a Bring & Buy, Junk stall, RSGB book stand and many traders. Car parking is now available. Enrolment for Foundation, Intermediate and Advanced Examination courses and Morse class. Nancy Bone, G7UUR, 0799 076 0920, nancybone2001@yahoo.co.uk.

15 SEPTEMBER

WEST TYRONE ARC RALLY

Omagh Rugby Club, 7 Mellon Park Drive, Omagh BT78 5NE.

Doors open at 11am and admittance is £3. There will be a talk in station, trade stands, special interest groups, a Bring & Buy and RSGB representation (NB no RSGB book stall). Catering and a licensed bar are available on site. A prize draw/raffle will take place. Philip Hosey, MI0MSO, 0784 902 5760, info@wtarc.org.uk.

22 SEPTEMBER

WESTON-SUPER-MARE RADIO RALLY

The Campus, Highlands Lane, Weston super Mare BS24 7DX (M5 J21).

Doors open 10am. Entry £3. Trade stands, Bring & Buy stall, catering and a large car park. Dave Dyer, 0787 103 4206, G4CXQ@btinternet.com.

22 SEPTEMBER

BELGIUM AMATEUR RADIO & COMPUTER RALLY

LOUVEXPO, rue Michel Debauque/Arthur Delaby, La Louvière. GPS N50°29'01" / E04°10'51".

Open from 9am to 4pm. Talk-in on local FM, DMR & D-Star repeaters. Trade stands from UK, Holland, Germany & France, flea market. Michel, ON7FI, +32 475 45 45 78, michel.dewyngaert@skynet.be [www.on6ll.be].

27-28 SEPTEMBER

NATIONAL HAMFEST

Newark & Nottinghamshire Showground, Lincoln Rd, Coddington, Newark NG24 2NY.

The country's largest and best two-day rally. Admission £5. Free car park, huge RSGB Book Stall, RSGB committee representatives, trade stands large and small from UK and abroad, large flea market, Bring & Buy, Buildathon (pre-book), club stands, national special interest groups, free raffle, on-site catering, camping (must pre-book). See feature on page 68. [www.nationalhamfest.org.uk].

6 Oct – **Welsh Radio Rally**
11-13 Oct – **RSGB CONVENTION**
13 Oct – **Hornsea Amateur Radio Rally**
13 Oct – **Holsworthy Radio Rally** (new venue)
19 Oct – **CW Convention and CW Boot Camp**
19 Oct – **Carrickfergus ARG Rally**
20 Oct – **Galashiels Rally**
3 Nov – **Bushvalley ARC Rally**
16 Nov – **Rochdale & DARS Winter Rally**
24 Nov – **Bishop Auckland RAC Rally**

RadCom

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RSGB

HF F-Layer Propagation Predictions for September 2019

Compiled by Gwyn Williams, G4FKH

Time (UTC)	3.5MHz 000011111220 246802468020	7.0MHz 000011111220 246802468020	10.1MHz 000011111220 246802468020	14.0MHz 000011111220 246802468020	18.1MHz 000011111220 246802468020	21.0MHz 000011111220 246802468020	24.9MHz 000011111220 246802468020	28.0MHz 000011111220 246802468020
*** Europe								
Moscow	985......999	477544457885	.3745555773.	..45666653..	..2233322...	...122211...	....	....
*** Asia								
Yakutsk	555	..........5.	.....3......	....	....	....	....	....
Tokyo	.........5..	.......555..	......33....	.....2......	....	....	....	....
Singapore	....	.......576..	.......554..	.......33...	....	....	....	....
Hyderabad	66	5665	........4...	....	....	....	....	....
Tel Aviv	97.......888	776.....7877	..643.35773.	..45545662..	.......22...	....	....	....
*** Oceania								
Wellington	........5...	......5.5...	...3334.....	....	....	....	....	....
Well (ZL) (LP)	....	..6.........	..4......43.	....	....	....	....	....
Perth	....	.......5554.	........34..	....	....	....	....	....
Sydney	....	.......555..	.......34...	....	....	....	....	....
Melbourne (LP)	....	...5........	...4........	....	....	....	....	....
Honolulu	....	....	....	....	....	....	....	....
Honolulu (LP)	....	....	....	........3...	........2...	........1...	....	....
W. Samoa	....	....	....34......	.....2......	....	....	....	....
*** Africa								
Mauritius	5........66.	4.......675.	.......565..	.......343..	........2...	....	....	....
Johannesburg	.6..........	.5......676.	........664.	.......354..	.......33...	.......12...	....	....
Ibadan	888.........	7.75.....777	..754...676.	...54...66..	...3....53..	........3...	....	....
Nairobi	.7..........	664......766	..5.....66..	........5...	....	....	....	....
Canary Isles	9995.....899	88874...5888	545655456885	2.273444774.	...45444671.	...2332343..	...1211132..	....11.121..
*** S. America								
Buenos Aires	....	5.5.......55	.........44.	.........3..	.........2..	....	....	....
Rio de Janeiro	..6.........	5.5.......65	.........54.	.........4..	........23..	....	....	....
Lima	....	....	....	....	....	....	....	....
Caracas	....	5..5.......6	....4.....4.	....	....	....	....	....
*** N. America								
Guatemala	....	...5........	....	....	....	....	....	....
New Orleans	....	....	....	....	....	....	....	....
Washington	7886.......7	5...4.....46	.....333334.	.....43334..	....	....	....	....
Quebec	7875.......6	46	.......334..	.........2..	....	....	....	....
Anchorage	....	..4.........	....	....	....	....	....	....
Vancouver	..6.........	....	....	....	....	....	....	....
San Francisco	....	....	....	....	....	....	....	....
San Fran (LP)	....	....	....	.......2....	.......2....	.......1....	....	....

Key: The figures represent approximate S-meter readings, whilst the colours represent expected circuit reliability. **Black** equals low to very low probability, **Blue** equals good probability and **Red** equals a strong probability. No signal is expected when a '.' is shown. The RSGB Propagation Studies Committee provides propagation predictions on the internet at www.rsgb.org.uk/propagation/index.php. An input power of 100W and a dipole aerial has been used in the preparation of these predictions; therefore a better equipped station should expect better results. The predicted smoothed sunspot numbers for September, October & November are respectively (SIDC classical method – Waldmeier's standard) 3, 3 & 3 and (combined method) 11, 14 & 15. The provisional mean sunspot number for July was 0.9. The daily maximum / minimum numbers were 9 on 7 July and 0 on 2-6, 9-21 and 23-31 July.

144MHz & THE WRC THREAT

Ian Robinson, GW1AWH

The *RadCom* Editorial entitled *144MHz and the WRC threat*, while being an accurate summation of the threat to the 2m band from the French industrial/ political combine does not address the 'elephant in the room'. The devil is definitely in the detail here! Document PTA(19)090R1 submitted by the French representatives at the Prague PTA-6 meeting of CEPT/ ECC and dated 14 June 2019 (ie little time for effective responses!) states the following: *".... that the band 144-146MHz is allocated to the Amateur and Amateur-Satellite on a primary basis in* ***all*** *Regions and may be considered for possible new allocations to the aeronautical mobile service on a* ***PRIMARY*** *basis*." (Note: my emphasis with highlighted text here and below.)

Further PTA(19)090R1 Draft Proposal goes on to state: *"that new allocations for the aeronautical mobile service in the range 144-174MHz would extend existing the allocation in 138-144MHz and would ensure the possibility to develop systems operating on a* ***wider tuning range*** *providing that the protection of the incumbent services is ensured."*

I take this to be the Amateur and Amateur-Satellite allocation on the 144-146MHz band being relegated from Primary to a subservient Secondary basis with the complete 2m band being effectively absorbed into the aeronautical bands over time. Once enacted, we would lose whatever control over the 2m band we had and the French politico-industrial complex would 'engineer' our forced removal. While the initial stated consideration refers to Region 1 (Europe) the proposal omits any regional limitations, suggesting the scope is **global,** with world-wide potential degradation or loss of the 2m amateur band. Not surprisingly the American Radio Relay League and the International Amateur Radio Union are seriously unimpressed.

Resolution 659 (WRC-15) has already stated that: *"... some non-amateur satellites have used frequencies for telemetry, tracking and command in the frequency bands 144-146MHz and 435-438MHz which are allocated to the Amateur-Satellite service, and that such use is not in accordance with Nos. 1.56 and 1.57."*

So much for protection of the incumbent services!

It should be noted that the major 'player' in European aeronautical (Aerospace?) industries and activities are the French, with their industries closely supported by their government. I would consider any French political promises to international (ie foreign) organisations regarding *"protection of the incumbent services is ensured"* as demonstrated already to be as valid as the French Franc. It's simply not in **their** interest. Failure to prevent this bandwidth grab would indeed be the start of the proverbial slippery slope and should rightly be regarded, as Murray, G6JYB stated, a "casus belli". Failure is not an option!

Ian, I congratulate you on your diligent reading! You are absolutely right that checking such detail (and being in the key meetings!) can be rather important on regulatory matters.

Some of that WRC-23 144MHz proposal detail is now slightly different in the updated version that came out of the CEPT Prague meeting and will be up for final adoption by all of CEPT at the end of August. You are also quite right in observing the scope has global reach for all three ITU Regions if administrations agree. You can find the latest version on the RSGB focus pages at http://rsgb.org/wrc-19 that will carry further updates, along with GB2RS news.

It is also no secret that other French positions in the CEPT WRC-19/23 process have caused us serious issues, both for Agenda Item-1.1 on 50MHz and another WRC-23 proposal that unfairly threatens our continued Secondary shared use of 23cm. So it is not just 144MHz keeping the RSGB and other IARU Spectrum managers rather busy at present; and indeed all three bands were included in the President's letter to Ofcom.

It is quite understandable that France will support its major national champions such as Thales. Our challenge is to persuade our UK regulator to support its own UK stakeholders.

With respect to the older WRC-15 resolution, I can state that referred amongst other things to 'experimental' (aka commercial) satellites sanctioned by the USA in direct contravention of the ITU Radio Regulations. So you can't always blame the same one European country!

Murray Niman, G6JYB, RSGB Spectrum Manager

INTERFERENCE

Colin Turner, G3VTT

I would like to thank Dr Martin Sachs, G8KDF for his reply to my recent letter in *RadCom* regarding the ongoing VDSL interference and for his Committee's hard work in EMC matters and also to Philip Willis, M0PHI for outlining the current position on VDSL interference resolution by legal means.

So there will be no court case and I am now wondering what ever happened to the notion of speaking truth unto power and justice albeit on behalf of a small part of the amateur population? It is now clear RSGB has no desire to initiate any legal action against BT/Openreach and I would suggest it is therefore up to the membership to be heard on this issue.

Under the Companies Act shareholders of a company do not need to attend an AGM and can still be heard by proxy voting which is set in law as are motions from the floor. Perhaps a BT/ Openreach AGM motion from amateurs holding BT shares could, with RSGB support, be heard?

A motion could be something like 'This motion is for BT and its contractors, suppliers and business partners is to formally record their commitment to comply with the various EMC directives as transposed into UK law and additionally that action is taken to resolve all non-compliances reported to them'. The RSGB EMC and the Technical Committees could offer to vet every submission to ensure the complaints have a legal basis and technical evidence could be provided by the forthcoming software.

I am aware of another amateur, not an RSGB member, who is fighting this QRM by means of the BT/Openreach AGM and communication with the CEO and I wonder what the feelings of the Society would be should he succeed?

Colin Topping, GM6HGW

With reference to the number of letters concerning interference to amateur frequencies, I am not surprised in the slightest at the lack of interest shown by Ofcom.

It is my view that the amateur community was duped when our licences became free. We pay nothing for our licences and the use of frequencies allocated to us; therefore we should not expect a service by the regulator. Ofcom investigators are far more interested protecting services of commercial users who pay to obtain their licences.

As individuals we are not party to the full discussions between Ofcom and the Society, only the Minutes as reported. Perhaps the time has come to involve specialist lobbyists to contact Members of Parliament expressing our views and concerns. Or for the RSGB to provide a letter for Members to send to their respective Members of Parliament expressing the demises of our hobby due to increasing interference.

I would be perfectly happy to pay for a licence in return for Ofcom to investigate increasing interference, the importation of illegal and non-compliant electrical goods that cause disruption to our frequencies; followed by proscription and or confiscation of errant equipment.

John Dunton, G1RXC

I have been following the interference / VDSL debate in The Last Word over the last six months or so. It seems to me that there are a couple of important points that need to be made.

1. Ofcom and Trading Standards (TS) are chronically underfunded and this has been the case for most of the last 30 years (including under past names), the sheer amount of non compliant electronic equipment sold both on the high street and online makes enforcement a practical impossibility unless there are emergency service/military implications.
2. I don't think there is a direct legal solution; broadband roll out is a political topic but there are some things that could be done, if a group of interested independent people were to set up a crowdfunded 'not for profit' as a limited liability partnership it could be used as a litigation vehicle without risk to national societies (this is not just a UK problem). The best target in the UK is probably to seek a Judicial Review of decisions about the funding for Ofcom/TS EMC enforcement.

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3. There are weak signal and very narrow bandwidth modes that can get through (statistically) even in the presence of significant interference, although these are usually automatic / unattended modes.
4. It would also be interesting to approach the technical challenge of operating in a very noisy environment, there may be some technical solutions that can be implemented without losing the human operator completely. Multi channel receiver front ends with parallel sub band adaptive filter channels, not unlike ECM receivers.

FT8, A PERSONAL PERSPECTIVE

Bob Lee, G8CQR

Pre FT8: Switch on, check around 50.100MHz for any CW activity then check from 50.125MHz to above 50.150MHz for SSB activity, cycle through the 20-odd beacons in memory. If beacons heard select best beam heading for a CQ, if no beacons heard and no activity discovered then band declared 'dead' and it's time to start XYL's to-do list.

Post FT8: Same routine but on a 'dead' band fire up WSJT-X and go to 50.313. Results recently have included contacts with Trinidad and Tobago, St Lucia, Puerto Rico, Oman, Western Sahara, Asian Turkey. Gotaways include Brazil, Benin, Nigeria and Kuwait.

70.154MHz FT8 has produced such goodies as Western Sahara, Malta and the Canaries. This is with a dipole aligned east/west at about 3m above ground at the end of 15m coax run.

Like them or loathe them, without the low signal modes things at my QTH would be far less interesting – just don't mention the XYL's to-do list.

IMPROVING YOUR CW

Richard Baker, G0AIH

I have been reading with interest all the Last Word letters regarding Morse code and some of the difficulties some Members have with speed.

I simply wanted to say that, as a fan of the mode, once the basics are learned one of the very best ways to improve listening accuracy and speed, is to simply leave the radio on in the background.

The lower end of the 20m band is ideal, this way you can paint that wall the XYL has been discussing with you for some time and the skirting boards, or even where required a bit of wallpapering.

This may sound like purgatory to some, but it certainly brings up your listening skills, also by listening on a spot frequency, some days the whole world passes by.

It keeps the wife happy too!

LONG DISTANCE TV

Mike Solomons, G8DKW

I saw, in the June edition of *RadCom*, a letter from Doug Smith concerning the reception of long distance TV in the 1930s.

He mentioned medium wave radio reaching from New York to the UK. In the 1960s, as a teenager, I used to listen to various US local radio stations on medium wave in the early hours of the morning, after the UK and European radio stations closed down for the night (those were the days!). I was using a 1932 Pye radio that I still own – and which still works – and a wire wrapped around the inside of the roof of my parent's house as an aerial, so, definitely, MW signals from the US were easy to receive in London once Europe had gone to sleep!

I also recall reading an article in which was described an Australian project. Apparently, an Australian enthusiast on, I believe, an enormous farm, had set up a huge Yagi tuned to Band 1 channel 1 to receive the BBC transmission of the Coronation of Queen Elizabeth 2nd in 1953. I do not recall the rest of his equipment. He was successful (obviously at that time there were very few transmitters operating on that frequency, so little interference!).

Just to round up, of less interest was my own experimental reception of French, Spanish and Italian television when I was 14 / 15 in the 1960s. Just using a scrap of wire as an aerial and a 1950s television that I modified, I received adequate but snowy pictures, (no sound, I didn't bother). The modifications? The IF wasn't sensitive enough so I added a further IF stage, (valve). I also realigned the IF for a narrower bandwidth, around 1MHz, to reduce noise (very effective).

HURDY GURDY RADIO MUSEUM

Dave Clouting, GM3YGS

Visitors to Ireland this summer may be as fascinated as I was if they pay a visit to The Hurdy Gurdy Museum of Vintage Radio in Howth, County Dublin. The first item that caught my eye was a CR100, the same as was used in the 1960s by my old friend Ken, G3XXC. The museum is located at the Martello Tower, Abbey Street, Howth, County Dublin D13 V099. The DART train from Dublin City makes for an easy journey to Howth, although we went by boat from Dun Laoghaire. The curator and lifelong collector of the exhibits is Pat Herbert, and he has amassed an amazing collection of historic radios; domestic, amateur and military, as well as other items of interest. The tower is packed from floor to ceiling over two levels and Pat is a great raconteur and enthusiast. The tower hosts EI0MAR, although it was not being operated when I visited. Pat explained how he was fascinated when younger at home in the west of Ireland to hear the radio for the first time, and he has lost none of his enthusiasm! I would be surprised if there is a larger collection of vintage radios anywhere else, and the tower was the site of early transmissions by Lee de Forest and Marconi. More information may be found on the website https://sites.google.com/site/hurdygurdymuseum/home

The photo above shows Pat Herbert, curator (left) and me, Dave, GM3YGS, with some of the collection.

'TOP SECRET' EXHIBITION

Stewart Hawkins

I just visited the exhibition in the Science Museum.

One of the exhibits was the story of the Russian spies, the Krugers. One of the items pictured in their bungalow was a radio aerial in their loft that was used to transmit Morse messages.

The aerial consisted of a wire that ran around the edge of the loft. As soon as I saw it, I remembered back to a council house I moved into with my parents in 1953. (I was 6 years old).

My father wondered why there was a small electrical socket on the skirting board in one of the rooms. He followed the wire to the loft, where he found an aerial running all around it! The loft was about 20ft by 20ft and had a lot of short vertical posts, about 6in high, fixed to the floor all the way round. They had a series of slots in, one above the other with the wire running through them, there must have been about four or five turns of wire. So probably 300 or 400 feet of wire in total.

We lived in the house for 25 years, and over this time, tried connecting the aerial to various radios, but I remember it didn't improve the reception on any of them.

Could this be because it was a transmitting aerial? Could we have had spies in Peckham, broadcasting secret messages to Russia? Or just a radio amateur? I'd like to hear your opinion on what this 'aerial' could have been used for.

CWC RADIO MARATHON 2019

César, EA1LT

I would like to congratulate you for the organisation of this marathon that has kept me on radio for more than a month hunting the GB19 and others special stations. I'm enjoying it. Thanks again and best wishes.

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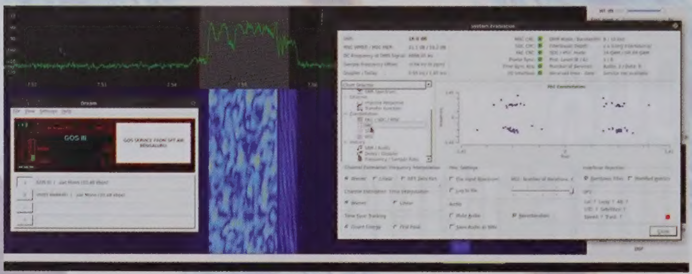

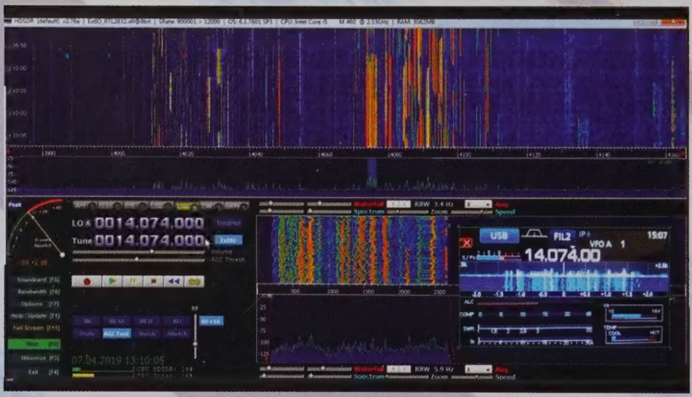

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